

**AN ETHICAL PERSPECTIVE ON THE EFFECTS OF GARBAGE  
DISPOSAL ON ENVIRONMENTAL AND HUMAN HEALTH: A CASE  
STUDY OF LIVINGSTONE CITY.**

**By**

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of the Requirements for the award of the Degree of Master of Arts in  
Applied Ethics**

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## Abstract

The aim of the study was to critically evaluate garbage disposal and its effects on human health and the natural environment in Livingstone city from an ethical perspective. The objectives were: (i) to determine the garbage disposal activities being undertaken; (ii) to establish the effects of garbage disposal on human health; (iii) to establish the effects of garbage disposal on the natural environment; and (iv) to make an ethical evaluation of the findings.

The research was a case study using qualitative methodology with an ethical component. Observation, interviews and Focus Group Discussions were used to collect primary data. Two Focus Group Discussions were conducted. Secondary data were obtained from relevant published and unpublished researches, clinical records, books, journals, newspapers and the internet. Data were analysed thematically and by identifying common patterns of behaviour. The theoretical framework involved the Land Ethic, the Precautionary Principle and Environmental Virtue Ethics.

The findings relating to the first objective were: (a) the waste stream comprises both organic and inorganic waste whose disposal is achieved mostly through the use of receptacles (36.6%) like tins and sacks, refuse pits (20%), burning (16.7%) and illegal dumpsites (16.7%); (b) 46.7% felt that the Council bears the responsibility of garbage collection and disposal in Livingstone; (c) 100% felt that the regulatory framework is ineffective; (d) 90% felt that awareness programs on garbage disposal are non-existent; and (e) (100%) of the residents are not involved in decision making regarding garbage management. The findings relating to the second objective were that diseases like cholera (50%), dysentery (6%), malaria (16.7%), respiratory tract diseases (10%) and intestinal worms (3.3%) are in many cases associated with improper garbage disposal. The findings relating to the third objective were: air pollution (23.3%), water contamination (20%), soil contamination (20%), aesthetic inconveniences (16.7%), land degradation (6.7%), blockage of drainages (3.3%), climate change (3.3%), reduction in animal grazing pasture, injuries and/or death to animals, and igniting of bush fires in game reserves.

With respect to the ethical evaluation, the Land Ethic's holistic emphasis on ecosystems brought out how garbage disposal contributes negatively towards human health and the natural environment; the Precautionary Principle emphasised that garbage disposal methods like burning, burying and others require putting in place precautionary measures to prevent harm before it occurs; Environmental Virtue Ethics highlighted the lack of virtuous character dispositions among Livingstone residents with respect to the wellbeing of the environment. The application of these diverse theoretical approaches all point towards the fact that garbage disposal practices in Livingstone city are ethically unacceptable.

The study recommended that the Livingstone City Council should adopt the following measures: (i) to enforce the laws governing garbage disposal; (ii) to conduct public awareness drives on sustainable garbage management; (iii) to provide garbage receptacles like skips in the community; (iv) to increase public involvement and participation in garbage management activities; (v) to regulate, monitor and supervise companies engaged in the collection and disposal of garbage; and (vi) that government should introduce a subject on the environment in both primary and secondary schools which should be examinable.

## **Dedication**

This dissertation is dedicated to my dad, mum, wife and sons: Timothy, Silishebo, Elijah and daughter, Tumelo, without whom, this work would not have been possible.

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## **List of Abbreviations and Acronyms**

ADB	: African Development Bank
BC	: Before Common Era
CBD	: Central Business District
COMEST	: World Commission on the Ethics of Scientific Knowledge and Technology
DMO	: District Medical Office
DEBS	: District Education Board Secretary
DESO	: District Education Standards Officer
ECZ	: Environmental Council of Zambia
EMA	: Environmental Management Act
FGD	: Focus Group Discussion
FRG	: Federal Republic of Germany
GRZ	: Government of the Republic of Zambia
KCC	: Kampala City Council
Km	: Kilometre
LA	: Local Authority
LAC	: Latin America and the Caribbean
LCC	: Livingstone City Council
MA	: Master of Arts
MSW	: Municipal Solid Waste
NCC	: Nairobi City Council
NGO	: Non-Governmental Organisation
NSWMS	: National Solid Waste Management Strategy
OAG	: Office of the Auditor General
OECD	: Organization for Economic Cooperation and Development
PAHO	: Pan American Health Organisation

3Rs	: Reduction, Reuse, Recycle
SSA	: Sub Saharan Africa
SWM	: Solid Waste Management
SWMS	: Solid Waste Management Strategy
UN	: United Nations
UNCED	: United Nations Conference on Environment and Development
UNDP	: United Nations Development Programme
UNESCO	: United Nations Education, Scientific and Cultural Organisation
USA	: United States of America
WHO	: World Health Organisation
ZEMA	: Zambia Environmental Management Agency

# CHAPTER ONE: INTRODUCTION

## 1.0 Background to the Study

Globally, millions of tonnes of garbage are generated each day. According to Strange (in Hester and Harrison, eds., 2010), garbage or municipal solid waste (MSW) is defined as wastes arising from private households to that collected by or on behalf of local authorities from any source. MSW therefore includes a proportion of commercial and non-hazardous industrial waste. Depending on the country, the definition can include some or all of: household wastes, household hazardous wastes, bulky wastes derived from households, street sweepings and litter, parks and garden wastes, wastes from institutions wastes from commercial establishments and offices (ibid, 2010). Industries, commercial entities, households and indeed every human activity generate garbage of some sort. The bulk of garbage that is generated is produced in the world's cities where, according to Hoornweg et al. (2013), around 1.3 billion tonnes of garbage are generated each day. This translates into each city dweller generating 1.2 kilograms per day and it is estimated that this will increase to 2.2 billion tonnes by 2025. This is a huge amount of garbage! Nearly half of this comes from the Organisation for Economic Cooperation and Development (OECD) countries. The United States of America (USA) leads the world in the generation of garbage followed by other leading industrialised countries (Cunningham and Cunningham, 2004). The reason for this is that these countries have high levels of consumption at the household level and as such generate huge amounts of garbage (Goudie and Viles, 1997). Third World Countries generate less garbage as compared to developed countries. However, these countries are steadily increasing in garbage generation. This is largely due to the rapid urbanisation and improving standards of living that have resulted in people consuming more. For instance, in Africa generation rates, are approximately 0.5 kg per person per day (USAID, 2014). While this may seem modest compared to the 1.2 kg per person per day generated in developed countries, most garbage in the developing world is not collected by municipal collection systems because of poor management, fiscal irresponsibility or malfeasance, equipment failure, or inadequate garbage management budgets (ibid, 2014).

When it comes to garbage management, industrialised countries, especially members of the OECD, are reasonably efficient regarding the disposal of garbage largely due to the fact that they have high standards of skills and technology. They also have financial resources necessary for such undertakings. Member countries of the OECD have been implementing the Environmentally Sound Management (ESM) of waste (OECD, 2007). Under this framework,

the overarching principle for waste management is the 3Rs, namely, reduce, reuse and recycle. These are modern methods of garbage management and they are sustainable. Mohanty (2011) argues that the significance of the 3Rs is that they offer an environmentally friendly alternative to deal with the growing generation of wastes and its related impact on human health and the natural environment. Awareness and education are very important when it comes to managing or implementing environmentally sound garbage collection and disposal practices. There are several ways in which the community can be engaged in environmental communication (Zhu et al., 2008; Dietz and Stern, 2008). Mahadevia et al. (2005) argue that sound garbage management practices thrive in an environment where channels of communication between the authorities and stakeholders are open with regard to garbage.

In Africa, many countries have been grappling with increased amounts of garbage. Faced with increased urbanisation, rapid population growth and industrialisation, quantities of garbage have been accumulating at an increasing rate. Wanton disposal of garbage in particular is a phenomenon typical of the large cities of Africa (Palczynski, 2002). According to Hoornweg and Bhada-Tata (2012), Sub Saharan Africa (SSA) generates approximately 62 million tonnes of garbage per year. Garbage generation is expected to increase because of changes in consumption patterns, rapid urbanisation, and increased population especially in the fast growing cities. This is unsustainable in the long term.

Zambia, like many other African countries, has been struggling to come to terms with increased amounts of garbage. It has generated millions of tonnes of garbage in different categories (ECZ, 2008) and the enormity of the task of collection and disposal of garbage has overwhelmed those responsible. This is despite the existence of a solid waste management strategy which is defined as that strategy which provides a coordinated approach to sound solid waste management (ECZ, 2004).

Livingstone district is one of the fastest growing in Zambia. Livingstone City is the tourist capital of Zambia. Until the year 2011, it was the provincial capital of Southern Province. With such prestige, however, come a number of challenges, one of which is the increase in the generation of garbage. As such, the city has not been able to deal decisively with the collection and disposal of garbage (UNDP, 2008; UN-HABITAT, 2009). The Department of Public Health and Social Services of Livingstone City Council (LCC) has the mandate of policy implementation, collection and disposal of waste, regulation and monitoring of activities of companies contracted to collect and dispose of garbage and generators of garbage, enforcement

of all laws and by-laws relating to garbage and coordination of actors involved in garbage management. Despite having the mandate, the Local Authority (LA) has struggled to meet this challenge. The district has a waste management unit which was established in 2006 and it has a licensed municipal solid waste disposal site (UNDP, 2008).

Most of the garbage that is generated in the district is not handled as per the stipulated guidelines. Garbage is collected only from affluent areas (UN-HABITAT, 2009). Sweeping of streets is restricted to Mosi-oa-Tunya road and other adjoining roads within the Central Business District (CBD). Residents in the less affluent areas have to devise alternative methods of garbage disposal which are not sustainable such as digging of pits in their backyards (Mulenga, 2014). The district, moreover, has a severe handicap in terms of the technical knowledge required for managing a properly functioning garbage management program. Lack of financial resources, low levels of awareness and inadequate environmental education in the district have contributed to garbage being indiscriminately dumped. The LA also has a serious problem with transport. The fleet is small and the vehicles constantly breakdown. This leads to a state of affairs where garbage is not collected for weeks on end. In order to get round this problem, the City Council has in the recent past tried to engage private companies in the collecting and disposal of garbage (Lusaka Times, 2012). However, the result of contracting out garbage collection and disposal to private companies is that only the areas with affluent people have been given preference (Nkansu, 1999).

Up until the mid-1980s, the LA used to provide each household in the district with a dust bin. These were used by households for disposing of the garbage at the household level. Then, after a week or so, trucks from the council would come to collect the garbage and dispose of it at a legally designated place. When the bin got worn out or went missing, it would very quickly be replaced. Indiscriminate dumping of garbage at household level was not an issue. But even then, the concept of the 3Rs was not practiced at source. There was no separation of garbage. What went into the bin was a mixture of different types of garbage. However, there was no garbage that lay unattended to anywhere in the district.

### **1.1 Statement of the Problem**

In order to ensure that garbage is disposed of in a manner that promote the wellbeing of the environment and human health in Zambia, those responsible have come up with dictates and stipulates enshrined in the Environmental Management Act of 2011 (GRZ, 2011b). However, despite the availability of such well-intended guidelines, garbage in the city of Livingstone

continues to be unsustainably disposed of. The inability or failure of the LA to collect and dispose of garbage as per standard guidelines is a cause for concern for they compromise the wellbeing of the environment and threaten public health. In the early years of the 2000s, the city had on occasion experienced outbreaks of diseases like cholera. Improperly disposed of garbage can also lead to blockages of drainages resulting in flooding and puddle formation. Accumulation of water in such a fashion provides an ideal ground for disease-causing vectors like mosquitoes. Furthermore, garbage that is improperly disposed of can become a sanctuary for rodents. Other than physical disease, improperly disposed of garbage can reduce the aesthetic value of a locality thus proving to be an eyesore which can keep tourists away from the tourist capital. It is not known for certain what the effects of unsustainable of unsustainable garbage disposal on human health and the natural environment are (Myers & Raffensperger, 2006). But despite the uncertainty of the effects of unsustainable garbage disposal on human health and the natural environment, garbage continues to be improperly disposed of in Livingstone city.

## **1.2 Aim of Research**

To critically evaluate garbage disposal and its effects on human health and the natural environment in Livingstone district from an ethical perspective.

## **1.3 Research Objectives**

The objectives of the study were as follows:

- (i) To determine the garbage disposal activities being undertaken in Livingstone district.
- (ii) To establish the effects of garbage disposal on human health in Livingstone district.
- (iii) To establish the effects of garbage disposal on the natural environment in Livingstone district.
- (iv) To make an ethical evaluation of the findings.

## **1.4 Research Questions**

Hence, the research questions were as follows:

- (i) What are the garbage disposal activities being undertaken in Livingstone district?
- (ii) What are the effects of garbage disposal on human health in Livingstone district?

- (iii) What are the effects of garbage disposal on the natural environment in Livingstone district?
- (iv) What does an ethical evaluation of the findings reveal?

### **1.5 Theoretical Framework**

The Land Ethic, the Precautionary Principle and Environmental Virtue Ethics were used as the theoretical ethical framework for evaluating garbage disposal activities and their effects on human health and the natural environment in Livingstone district. These acted as the basis for designing the research instrument for data collection, as well as a basis for evaluating the research findings.

### **1.6 Methodology and Methods**

The research was a case study design using qualitative methodology with an ethical component. The study was conducted in Livingstone, the tourist capital of the Zambia. The study involved both primary and secondary data. Primary data were collected through observations, interviews and Focus Group Discussions (FGD). An observation schedule was used to guide the researcher to observe incidences such as littering, dumping, collection and disposal of garbage. Multi-stage sampling was used to select thirty (30) household heads. Five (5) key informants and two (2) officials, one each from two private companies contracted to collect and dispose of garbage were purposively selected. Two (2) FGDs were conducted comprising eight (8) participants drawn from community members in Libuyu and Maramba. Data were analysed thematically by identifying common patterns of behaviour.

### **1.7 Significance of the Study**

Although there exists some research on garbage management in Livingstone city (UNDP, 2008; UN-HABITAT, 2009), the researcher did not come across studies that had been carried out on the issue of garbage disposal activities in Livingstone city with an ethical evaluation made of their effects on human health and the natural environment. As a result, there is paucity of information the study endeavoured to address. The research brought out more vividly the garbage disposal activities in Livingstone city and the environmental and health effects of garbage management activities.

The absence of adequate ethical information associated with environmental and health impacts of unsustainable garbage disposal practices makes it difficult for policy formulators and

conceivers to institute effective measures designed to remedy the problem. This study was also important because it would help in improving the quality of existing and future policies as regards garbage management activities and their effects on human health and the natural environment.

### **1.8 Operational Definitions**

**Human Health** : A complete of physical mental and social wellbeing and not merely the absence of disease or infirmity (World Health Organisation).

**Natural Environment** : A state in which all living things and non-living things occur in a particular region. The natural environment in its totality is the biosphere which is defined as the global sum of all ecological systems integrating all living beings and their relationships and also their interactions with surrounding natural non-living elements (Attfield, 2006).

**Garbage disposal** : the storing, handling, sorting, processing, treatment and utilisation and final location of waste to avoid adverse effects on the environment (GRZ, 2011b).

**Effect** : that which an agent produces; a result or a consequence.

**Ethical perspective** : A moral viewpoint which can be of character, obligation, results or equity. An ethical perspective can help in identifying and defining problems, force us to think systematically, encourage us to view things from different vantage points and provide us with decision making guidelines (May, 2013).

### **1.9 Ethical Issues**

This study respected rules governing informed consent. Participants were informed of what the research was all about, its time frame and the direction the research would take. They were told that they could refuse to participate and withdraw from the research at whatever point. Participation was voluntary and participants were assured of their right to refuse to volunteer certain information. They were also informed about the benefits and risks that would result from participation. Confidentiality, privacy and matters of anonymity were adhered to. The identity of participants was concealed and the information obtained was used only for purposes of research and no other person had access to it.

### **1.10 Delimitations**

The study was limited to a discussion on garbage or municipal solid waste in Livingstone district. It did not delve into all of the chemical aspects of solid waste. It also did not determine the amount of MSW in different categories generated in Livingstone.

### **1.11 Limitations**

The limitations of this study included limited time. It was challenging to combine work and studies. Some targeted household heads were not available. However, these were easy to replace because the sampling method used provided room for replacement. It was also difficult to get to the representatives of private companies contracted to collect and dispose garbage. Some felt the study was for the purpose of investigating how they operated. However, this was ironed out after the actual purpose of the study was communicated.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.0 Introduction**

This chapter gives a review of some of the relevant literature in the understanding of garbage disposal and its effects on human health and the natural environment. Several scholars and organisations have attempted to study the subject from different perspectives and some of these studies are briefly reviewed here, namely, from outside Africa, from within Africa, and from within Zambia. Finally, a summary of the pertinent issues arising from the literature and relating to ethical issues will be given.

### **2.1 Garbage disposal outside Africa**

A study carried out by Acurio et al. (1998) aimed at providing a diagnosis of municipal solid waste management in Latin America and the Caribbean (LAC). The study established that community participation regarding garbage management was poor and that the communities considered that this was the responsibility of the municipalities as people in general were not involved in the decision-making process regarding waste management problems. It noted that most countries did not have established policies or strategies for informing the public on matters relating to waste management and that only in some countries had environmental education been included in formal school programs. The study further reported that human health problems due to physical, chemical and biological agents contained in MSW were the main effects of poor waste management in LAC. Negative effects on the natural environment referred to were water resources, air and soil contamination in addition to negative impacts on the landscape (Acurio et al. 1998).

A general study on garbage disposal commissioned by the World Bank (Hoorweg, 1999) involved low income countries (Nepal, Bangladesh, Myanmar, Vietnam, Mongolia, India, China, and Sri Lanka), middle income countries (Indonesia, Philippines, Thailand, and Malaysia), and high income countries (Republic of Korea, Hong Kong, Singapore and Japan). The study found that low income countries with the lowest percentage of urban populations had the lowest waste generation rates, ranging between 0.4 to 0.9 kg per capita per day. It also established that Hong Kong in particular generated enormous quantities of construction and demolition waste which explained their exceptionally high per capita MSW generation rate in comparison to other countries. With regard to waste composition, it was found that generally all low and middle income countries had a high percentage of compostable organic matter in the

urban waste stream, ranging from 40 to 85 percent of the total. However, it was observed that China and India diverged from this trend because they traditionally used coal as a household fuel source. The ash that was subsequently produced was very dense and tended to dominate the waste stream in terms of weight.

The study further revealed that economic and population growth experienced by many Asian countries followed similar material consumption trends to those found in the United States and other industrialized countries over the past century. For instance, as China was experiencing rapid population and economic growth, municipal solid waste was increasing in excess of 10% per year.

A study undertaken in the United Kingdom by Strange (in Hester and Harrison, eds., 2010) noted that the UK generated more than 400 million tonnes of solid waste in the following approximate proportions: agriculture (19%), mining and quarrying (18%), construction and demolition (17%), industrial (16%), dredged spoils (12%), sewage sludge (8%), municipal solid waste (7%), and commercial (4%). Although these waste streams constituted a small fraction of the solid wastes, nevertheless Strange (ibid.) contended that garbage or MSW is in many ways the most significant waste stream because it stems from our life style choices, our consumption and resource recovery decisions. The study reported that the extent of garbage disposal is largely a function of the type of waste generated and the characteristics of the waste. It recommended that a strategy for garbage management should stress the need for the following: (a) to reduce waste movements and improve transport regulations; (b) to apply new and better waste management tools (e.g. regulatory and economic instruments); (c) to compile reliable and comparable statistics on waste; (d) to design an adequate waste management plan, and (e) to enforce appropriate legislation.

## **2.2 Garbage disposal within Africa**

### **2.2.1 Zimbabwe**

A study was conducted in Victoria Falls, Zimbabwe, by Masocha (2004). It established that the quality of the garbage management service provided by Victoria Falls municipality was poor. This was evidenced by the fact that levels of waste collection were only 60% of the total garbage generated per month. Furthermore, there was failure to provide a formal garbage collection service to informal settlements in addition to widespread illegal dumping. Masocha attributed the poor performance of Victoria Falls garbage management system to a lack of

adequate funds, equipment and personnel on the part of Victoria Falls municipality. The study also established that most solid wastes in Victoria Falls town were generated in residential areas, factories, warehouses, retail shops, offices and institutions such as hospitals and hotels, vegetable and fruit markets as well as construction sites. It further found that over a four year period, the quantity of solid waste generated in the town had increased by 60%. The increase was attributed to rapid urban population growth, the high number of tourists who visited the town and widespread street vending and hawking.

It became clear from the study that the rudimentary disposal methods then in use in the town such as crude dumping and open waste burning threatened public health. Increases in sanitation related diseases such as malaria and dysentery were attributed to increases in the number of open waste dumps which provided ideal breeding conditions for several disease vectors such as mosquitoes and houseflies. With regard to waste collection and transportation, solid wastes were collected once per week in high density areas, twice per week in affluent suburbs and daily in the CBD and from hotels. About 60% of the solid waste was disposed of through crude tipping (a disposal method in which wastes are merely mechanically tipped or dumped and left uncovered in open areas), 26% through illegal open dumping, 10% through burning, 1.5% through waste burying, 1.5% by compositing and 2% by recycling.

### **2.2.2 Kenya**

A study conducted on solid waste management in Nairobi, Kenya, was designed to identify the range of actors and institutional arrangements involved and the extent to which they contributed to sustainable development (Karanja, 2005). In her assessment of the regulatory framework, among the key findings were that in accordance with the Public Health Act in Kenya, the Department of Environment of Nairobi City Council (NCC) was responsible for the implementation of policy, the collection and disposal of waste, the regulation and monitoring of activities of waste companies and generators of solid waste, the enforcement of all laws and by-laws relating to solid waste, and the coordination of actors involved in solid waste management. The private companies in Nairobi operate without any regulation, monitoring or supervision by the NCC. The study further revealed that private sector participation in solid waste collection was spontaneous, unplanned and open to competition independent of NCC regulations. Consequently, companies violate many of the solid waste laws and by-laws, especially those concerned with disposal of wastes.

On the role of the private sector, it was found that about 60 companies provided solid waste collection and disposal services in the city. Karanja's survey of 128 households found that 48% of the respondents did not receive solid waste collection service at all, 3% were served by the NCC, 4% by Community Based Organisations and 45% relied on private companies. The study also revealed that residents in the high and middle income areas relied on private companies for solid waste collection and disposal.

Karanja noted that the NCC in Kenya did not carry out scheduled collection in the city, especially in the informal settlements or slum areas. Collection and disposal services were only called upon when needed. Heaps of garbage were left in the city to decompose. The monitoring and enforcement of the collection, transportation and disposal activities of waste companies were inadequate because of weak enforcement of NCC by-laws. The study further revealed that a large proportion of the residents in Nairobi did not pay user fees due to inadequate arrangements for its collection. The user fees in Nairobi were relatively low since garbage collection was treated as a "public good".

The study concluded that while composting of organic waste was important because it makes available nutrients for soil replenishment and reduces the amount of waste to be landfilled, the composting of organics in Nairobi was minimal. Furthermore, it noted that the recycling of organic solid waste using appropriate technologies would contribute to sustainable solid waste management.

### **2.2.3 Uganda**

An Office of the Auditor General (OAG) report in Uganda on solid waste management in Kampala found that Kampala City Council (KCC) and its divisions were not regularly updating the database to reflect the changing environment in solid waste management (OAG, 2010). It was further observed that in failing to create a database concerning waste management variables, most of the efforts put into the preparation of work plans, budgets and decisions did not appropriately address the challenges faced in garbage collection and disposal. The report concluded as follows: (a) that division budgets, especially on waste management, were not based on proper assessment of garbage being generated, and therefore could not provide enough funds for garbage collection, transportation and disposal; and (b) that garbage collection, transportation and disposal had remained a major challenge to KCC and its divisions due to inappropriate strategies, budgets and decisions made due to lack of appropriate data.

The study noted that solid waste awareness campaigns were not conducted by KCC and its divisions as required by the Solid Waste Management Strategy of 2002 which stipulated that members of the public were supposed to be educated in matters of waste management such as the separation of garbage according to categories of organic and inorganic, efficient use of skips (container for receiving, transporting and dumping bulky non-compactable wastes), waste recycling, home composting, waste minimization and adherence to waste management laws to increase collection coverage to 80% from 40%. The study pointed out that most city dwellers were not aware of the KCC solid waste ordinance 2000 which had led to unacceptable and prohibited waste management practices such as indiscriminate littering and disposal of garbage.

The study finally established that KCC and its divisions were not enforcing the solid waste management by-laws despite the existence of a fully-fledged enforcement department. Consequently, this lack of enforcement of the by-laws led to indiscriminate disposal of garbage and other hazardous practices such as burning of garbage in the city which was prohibited by law resulting in the blockage of the drainage systems and thus contributing towards epidemics such as cholera around the city slum areas and suburbs.

### **2.3 Garbage Disposal within Zambia**

The Environmental Management Act was enacted by the parliament of Zambia on 12<sup>th</sup> April, 2011. Some of the salient features of the Act especially with respect to garbage collection and disposal, among others include: providing for an integrated environmental management and the protection and conservation of the environment and the sustainable management and use of natural resources and providing for public participation in environmental decision making and access to environmental information (GRZ, 2011b). According to the Environmental Management Act of 2011, it is an offence for a person to collect, transport, dispose of, or otherwise manage waste in a manner that results in an adverse effect, or creates a significant risk of an adverse effect occurring. On punishment to be meted out against those who contravene, the Act states that it is an offence for a person to dispose of waste in such a manner that it becomes litter or is likely to become litter and succinctly states that a person who goes in contravention of this commits an offence and is liable, upon conviction, to a fine not exceeding five hundred thousand penalty units or to imprisonment for a period not exceeding five years, or both. Furthermore, it is revealed in the Act that a local authority within its garbage control area could promulgate by-laws for the disposal of garbage.

On the role of local authorities in garbage collection and disposal within its area of jurisdiction the Act states that a local authority should: (a) collect and dispose of, or arrange for the collection and disposal of, all household waste in accordance with this Act; (b) ensure that waste is collected, transported and disposed of in accordance with this Act; (c) ensure that waste management services are provided within its jurisdiction in a manner which prioritises the recovery, reuse and recycling and provides for the treatment and safe disposal of waste; (d) take all practical measures to promote and support the minimisation of waste and the recovery of waste, particularly at the point at which it is produced; (e) provide litter receptacles in public places; and (f) prepare and submit to the Agency for approval, an integrated waste management plan that conforms to the requirements of the Agency, including any national waste management strategy published by the Agency (GRZ, 2011b). It is further stated in the Act that local authorities should report annually to the Agency on the types of waste and the quantity of each type of waste generated and disposed of within its area of jurisdiction and on the implantation of its waste management plan (ibid).

### **2.3.1 Lusaka**

#### **2.3.1.1 Kamanga compound**

A study based on 120 households conducted in Kamanga compound in Lusaka to establish waste management strategies at household level revealed that 53.3% of respondents stored the waste, 19.2% burnt the waste and 10% buried it (Munthali, 2006). The study also found that 28.3% used sacks as waste receptacles, 13.3% used litter bins and 1.7% used plastic bags. What is clear is that garbage management was not done in an organised way. People were not disposing of their garbage sustainably. Although the study by Munthali raises issues pertinent to garbage management, however no effort was made in the study to discuss the ethical implications of indiscriminately dumped garbage and its effects on human health and the natural environment.

#### **2.3.1.2 Ng'ombe compound**

A study conducted by Sichaaza (2009) related to an assessment of knowledge, attitudes, and practices towards waste management among Ng'ombe residents concluded that the majority of residents (73%) had not received any education on waste management. Of those who reported to have some education on waste management, 31% got it from the health department, 19% from

community based enterprise workers, 6% from television, 6% from parents, 6% from Ward Development Committees, 13% from radio and 19% from megaphone announcements. The study further revealed that all the respondents had no knowledge about waste reduction and that 75% did not know of any company that recycled waste. In addition, Sichaaza reported that 100% of those interviewed did in fact know about the dangers of waste in their environment. For instance, they mentioned that a dirty environment causes diseases such as cholera, dysentery, typhoid, diarrhoea, hookworms, tuberculosis and coughs.

### **2.3.2 Kabwe**

In a study conducted in Kabwe (Pasi, 2012), 150 households were asked to express how waste affected people and the environment. The respondents pointed to air pollution (70%), soil contamination (10%), drainage blockages (2%) and ecosystem disturbance (18%) as effects on the environment. The study further found that cholera (80%), lung cancer (5%), dysentery (12%) and coughs (3%) were the diseases that could result from garbage that is improperly disposed.

Pasi concluded by outlining the following effects of waste on the environment: (a) that town becomes filthy and dirty due to littering; (b) drainages are blocked; (c) air pollution is caused through burning and decomposing of garbage; and (d) the soil is contaminated due to containers of harmful insecticides, agricultural pesticides, fertilizers, perfumes and lotions.

### **2.3.3 Livingstone**

An important study carried out by the United Nations Development Programme (UNDP) in 2008 reported on the state of the environment in Livingstone District. It found that the city generated up to 83.3 tonnes of waste per year, that most of this waste was generated in the low income areas and that much of the waste generated in the city was uncollected. The report further noted that the city council placed more emphasis on commercial areas like the town centre area, hotels and lodges, when it came to garbage collection. In high density areas like Dambwa, Libuyu, Linda, and Maramba, the report said that waste was not collected. It noted that there were two waste disposal sites in the city, one operated exclusively by Sun International Hotel which is located 500 metres away from the closest residential and commercial buildings and which was used as a burrow pit for building sand. The second site, located north of the town, is situated in a valley line and is close to a natural water source. Here, garbage is dumped haphazardly over a very large area.

A year later, it was confirmed that Livingstone had poor environmental practices and a high rate of waste generation (UN-HABITAT, 2009). This report noted that environmental challenges were more pronounced in the rainy season when there are usually outbreaks of water borne diarrheal diseases like cholera. It further stated that whereas the CBD of Livingstone was kept fairly clean with regular collection services, the areas outside the CBD were not serviced. Furthermore, garbage in residential areas was either disposed of in backyard pits or dumped in open spaces.

The current study will provide a more specific assessment of garbage disposal activities in Livingstone than has been presented in the UNDP and UN-HABITAT reports, and it will in addition make an ethical assessment of their effects on human health and the natural environment there.

## **2.4 Common elements emerging from the literature**

For purposes of analysis and discussion with reference to the data that will be collected in this research, the following common elements are noted as emerging from the brief literature review above:

- There is a lack of education and awareness with regard to garbage disposal.
- There is a growing involvement of the private sector in garbage disposal.
- Garbage is collected mainly in the affluent localities,
- There is non-adherence to integrated garbage management policies or guidelines.
- The emphasis on diseases due to infections like cholera, dysentery, malaria is more common as compared with congenital diseases.
- Population growth, industrial development, and changing consumption habits are factors contributing to the increased generation of garbage.
- Garbage management activities are in the hands of local authorities.
- There is a general lack of enforcement of rules and regulations regarding garbage disposal.
- The bulk of the garbage is comprised of decomposable materials.
- Affluent countries are more efficient in garbage management and in mitigating the effects of garbage disposal than less developed countries.

Virtually all the themes mentioned above involve ethical issues although these are not specifically mentioned in the studies referred to. This study will draw attention more specifically to ethical issues by making an ethical evaluation of garbage management practices in Livingstone.

## **CHAPTER THREE: ETHICAL THEORETICAL FRAMEWORK**

### **3.0 Introduction**

This chapter presents the Land Ethic, the Precautionary Principle and Environmental Virtue Ethics as a framework that has been used to guide and evaluate the data collected with respect to disposal of garbage and its effects on human health and the natural environment in Livingstone district.

### **3.1 The Land Ethic**

Formulated by Aldo Leopold in the 1940s, The Land Ethic states that human beings ought to perceive themselves as part of a wider community, the biotic community which includes not only all living things but also all members of the ecological system. His definition of an environmental ethic is as follows: “A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise” (Olen and Barry, 2002:502). An ecosystem is said to have integrity because of the communion of elements that are interdependent. These elements combine into a closely knit harmonious whole with a character that is specific to itself. Thus there is unity in diversity. The magnificence of this harmony and unity of the various elements is what creates the beauty. The system has stability for the reason that change is brought about gradually and in a harmonious way.

Two things are notable about this point of view. First, it is non-anthropocentric. Equally important, it is not individualistic. What is to be considered as morally fundamental is not the good of individual members of the biotic community, but the good of the community itself. Thus, the land ethic is often considered to be a holistic ethic, that is, we have duties not just to individuals but to the whole - to the biotic community. The source of the land ethic is ecology, the science of interrelationships among organisms and their environments. Given a full understanding of the interdependence of plant and animal life, soil, air, and water, the biotic community should be thought of as a vast collective organism with its own morally important interests.

Another important tenet of the Land Ethic is what Leopold calls the biotic pyramid. It is a “system of energy transfer and capture” (Wenz, 2001:146). Plants absorb energy from the sun. This energy flows in a conduit called the biota, which may be represented by a pyramid consisting of layers. The bottom layer is the soil. A plant layer rests on the soil, an insect layer on the plants, a bird and rodent layer on the insects, and so on, up through various animal groups to the apex layer which consists of larger carnivores. In the words of MacKinnon, “land should be thought of as a fountain of energy flowing through a circuit of soils, plants and animals” (MacKinnon, 2012:349). Energy is metaphorically water in the fountain. Set against the foregoing backdrop, the focus of the Land Ethic is on the ecosystem, a holistic ethic that looks to the overall health and wellbeing of the ecosystem rather than to the individual living forms within it.

The Land Ethic will help in understanding how destruction of the ecosystem or injury to environmental health through careless disposal of garbage also has a bearing on the health of humans. Also the essence of the Land Ethic of guiding and evaluating in data collection as the data collection tools indicate and ethical evaluation of the collected data respectively. The holistic appeal of the Land ethic and its emphasis on ecosystems is what makes it admissible in coming to an accurate ethical understanding of garbage disposal and its effects on human health and the natural environment in Livingstone.

### **3.2 The Precautionary principle**

The Precautionary Principle emerged in the early 1970s in the then Federal Republic of Germany (FRG) or West Germany. It is an English translation of *vorsorgeprinzip* which in its literal sense means foresight and preparation. Although other countries like the USA and UK had already incorporated elements of precautionary thinking in their environmental policies at the time, it was the FRG that developed it into a broader environmental philosophy. In the 1980s it was used to implement policies designed to tackle acid rain, global warming, and pollution of the North Sea (Martuzzi and Tickner 2004)

Martuzzi and Tickner (2004:7) state that “in cases of serious or irreversible threats to human health and the natural environment, scientific uncertainty should not be used as a reason to postpone preventive measures.” And in the words of Carl Smith, “the precautionary approach is a logical extension of common sense concepts that guide daily life.” It challenges us to prevent harm before it occurs” (Smith, 2000:263). In its simplest form, the precautionary principle has a dual trigger: if there is potential for harm from an activity and if there is

uncertainty about the magnitude of impacts or causality, anticipatory action should be taken to avoid harm (Gardiner, 2006). Gardiner therefore notes that the dual trigger has three important components: threat of harm, uncertainty of impact and causality, and precautionary response.

The Precautionary Principle has been endorsed at the highest level of policy formulation. For example, it was incorporated in the 1987 Montreal Protocol (COMEST, 2005). The Montreal protocol has been accepted globally thus giving credence to the principle. In 1992 at the United Nations Conference on Environment and Development (UNCED) called the “Earth Summit”, precaution as a concept was included in the Rio Declaration on Environment and Development in acknowledging the integral and interdependent nature of Mother Earth. According to the Earth Charter Commission (2012), it was proclaimed in Principle 15 that:

In order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Cooney has stated that “where there is uncertainty concerning the impacts of an activity, rather than assuming human economic activities will proceed until and unless there is clear evidence that they are harmful, the precautionary principle supports action to anticipate and avert environmental harm in advance of, or without, a clear demonstration that such action is necessary” (Cooney, 2004:6).

The Precautionary Principle outlined above is critical to this study because the natural environment and human beings have limited capacity to absorb the effects of careless and harmful disposal of garbage that accumulate over the years as evidenced by warning signs presented through the increase in chronic diseases and conditions, congenital or birth defects and developmental disabilities, as well as the dying of certain plant/animal species whose cause is not so certain (Myers & Rafflesperger, 2006). It will also act as a guide in the process of data collection (as indicated on the data collection tools) with a view to identifying elements that have to do with precautionary measures and preventing harm before it occurs as it were. This will bring to the fore ethical issues that conform to the principle. Other than guiding in data collection, the Principle will also help in making ethical evaluation of the data thus collected as it relates to garbage disposal and its long-term effects on human health and the natural environment in Livingstone.

### 3.3 Environmental Virtue Ethics

Aristotle, who lived between 384 B.C. and 322 B.C., is the foremost of the early proponents of virtue ethics. The word virtue originally came from the Latin “*virtus*” which means strength. For Aristotle, the Greek word used was “*arête*” which referred to excellences of various types (MacKinnon, 2012). Virtues are attitudes, dispositions, or character traits that enable human beings to be and to act in ways that develop this potential. According to Curry, a virtuous character is epitomised by such virtues as temperance, justice, courage and wisdom. These constitute what Aristotle called *eudaimonia*, which is often translated as happiness, and a person who embodies it will also promote it among others (Curry, 2006).

There are two types of excellences or virtues namely, intellectual virtues and moral virtues. Intellectual virtues are excellences of mind, such as the ability to understand and reason and judge well. This type of virtue is fostered mainly by teaching. On the other hand, moral virtues dispose people to act well. They are an outcome of habit learnt not by being taught but by repetition. According to Beauchamp et al. (2008:18):

People are viewed as acquiring virtues much as they do skills such as carpentry, playing an instrument, or cooking. They become just by performing just actions and become temperate by performing temperate actions. Virtuous character is cultivated and made a part of the individual, much like a language or tradition.... Virtue ethics has practical value in that a morally good person with right desires or motives is more likely to understand what should be done, to perform required acts, and to form moral ideals than is a morally bad or indifferent person.

Virtues then are habits, that is, once they are acquired, they become characteristic of a person. For example, a person who has developed the virtue of generosity is referred as a generous person because he or she tends to be generous in nearly all circumstances. A person who has developed virtues will be naturally disposed to act in ways that are consistent with moral principles. The virtuous person is an ethical person.

For virtue ethics, the fundamental question is “What sort of person should I become?” and not “What should I do?” Virtue Ethics is concerned with those traits of character that make one a good person and it seeks to produce excellent persons who act well out of spontaneous goodness and serve as examples to inspire others. The moral life is thus, not simply a matter of following moral rules and of learning to apply them to specific situations; it is rather, a matter of trying to determine the kind of people we should be and of attending to the development of character within our communities and ourselves. This understanding of traditional virtue ethics has laid the foundation for understanding Environmental Virtue Ethics.

According to Sandler (in Keller, ed., 2010), environmental ethics is the attempt to understand the human relationship with the environment and to determine the norms that should govern our interactions with it. These norms can be either norms of action or norms of character. Specifying norms of character is what constitutes environmental virtue ethics. Hence, a particular account of the character dispositions that we ought to have regarding the environment constitutes an environmental virtue ethic (ibid, 2010). These dispositions include, for example, wonder, sensitivity, respectfulness, appreciation and gratitude.

It is thus clear from the foregoing that it is essential to have the right attitude and dispositions in how we approach the environment. It is clear that we are implored to do well to the environment and have good character dispositions regarding the environment. The environmentally virtuous person is disposed to respond - both emotionally and through action - to the environment in an excellent or fine way. Sandler (in Keller, ed., 2010:253) has written as follows:

Environmental Virtue is not merely instrumentally valuable as the disposition to identify and then perform proper action; it is also valuable in itself. It is life-affirming and life enhancing. Those who possess it are better off than those who do not, for they are able to find reward, satisfaction and comfort from their relationship with nature; and it is their character-their capacity to appreciate, respect and love nature-that opens them to these benefits. To those who are receptive to it, nature is a source of joy, peace, renewal and self-knowledge.

This study is about garbage disposal and its effects on human health and the natural environment in Livingstone district. Given this, Environmental Virtue Ethics will act as an aid to collecting data as the data collection tools indicate. It also aided in making an ethical evaluation of the data collected. In particular it will assist in establishing whether garbage disposal practices in Livingstone are in conformity with character dispositions that promote the wellbeing of the environment.

## **CHAPTER FOUR: METHODOLOGY**

### **4.0 Introduction**

The chapter is divided into four sub sections which describe the location of the study, the research design, the study population and sampling procedure and ethical consideration.

### **4.1 Research Design**

This research was a case study design using qualitative methodology with an ethical component. A case study design is one which focuses on a particular unit in detail, in context, and holistically (Kombo & Tromp, 2006). In a case study the object to be studied is looked at as a whole. The case study approach was preferred to other designs because it enabled a more detailed and thorough investigation of one case, Livingstone city. It enabled consideration of all aspects of the subject matter and study site in much detail (Bless and Achola, 1988).

The methods used involved primary and secondary data. The primary data tools were observation, in-depth interviews and focus group discussions. The secondary data involved relevant published and unpublished researches, clinical records, books, journals, newspapers,

review of teaching materials for Grades 1-9 in public schools and the internet. Data were analysed thematically and by identifying common patterns of behaviour. The data collection instruments are attached as appendices. The findings were evaluated using the Land Ethic, the Precautionary Principle and Environmental Virtue Ethics.

#### **4.2 Location of Study**

The study was conducted in Livingstone, Zambia. Livingstone district is located at 25°51'-25°56' E and 17°51'-17°55' S in the Southern Province. The various localities of Livingstone district are shown in figure 4.2. The district has a land surface of 695 square kilometres. It has an estimated population of 139 509 (GRZ, 2011a) and is the tourist capital of the country. Livingstone is an urban locality and as the tourist capital, it prides itself on having five hotels and upwards of fifty lodges and a chain of fast food outlets. There are also multinational supermarkets like Shoprite and Spar. Trading centres, commonly known as markets, are dotted in all parts of the city. As such, the city has to grapple with indiscriminate dumping of garbage.

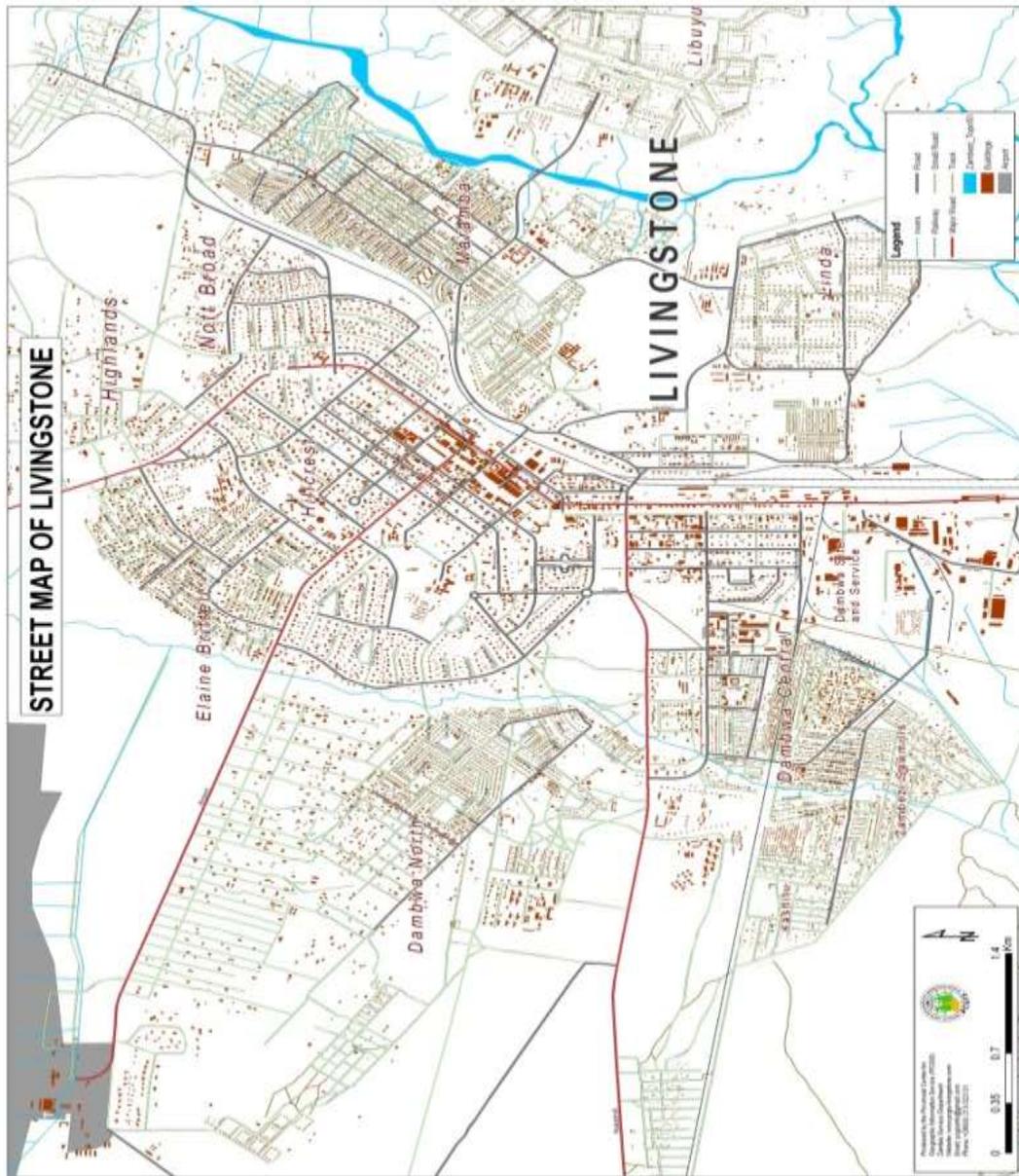


Figure 4.1: Map of Livingstone City

Source: Ministry of Lands, Environment and Natural Resources, 2015

### 4.3 Study Population

The target or study population for this study from which the sample was drawn comprised the following: (a) householders of Livingstone city in either low cost, medium cost or high cost; (b) Zambia Environmental Management Agency responsible for the legal and regulatory framework of garbage management activities; (c) Livingstone City Council (LCC) tasked with the collection and disposal of garbage and educating and raising awareness on garbage disposal (d)

Livingstone District Medical Office (DMO) and DEBS the implementers of health policy and education policy at community level, respectively; (e) Zambia Wildlife Authority (ZAWA) the statutory custodian of wildlife in Zambia; and (f) Professional Waste Solutions and Zambia Residue Exporters which are the companies contracted to collect and dispose of garbage.

#### 4.4 Sample Size

The sample size in this study comprised thirty (30) adult members of households of Livingstone city, five (5) key informants drawn from the Zambia Environmental Management Agency (ZEMA), Livingstone City Council (LCC), Livingstone District Medical Office (DMO), Zambia Wildlife Authority (ZAWA) and Livingstone District Education Board Secretary's (DEBS) Office. In addition, there were two (2) officials from two private companies that are engaged by LCC to collect and dispose of garbage in the district and sixteen (16) FGD participants selected by approaching people who had gathered at Maramba and Libuyu health centres. These were adults aged 20 years and above. The discussants were drawn from the clinics because they are rendezvous for Neighbourhood Health Committees. The sessions lasted for approximately an hour. Maramba and Libuyu health centres were purposively selected since they portray social stratification on the basis of medium density and high density localities respectively. The distribution of the study sample by household and institution is shown in table 4.1 below.

Table 4.1: Study Sample Distribution by Individual/Household/Institution

<b>Locality/Institution</b>	<b>Individual</b>	<b>Household</b>	<b>Officials</b>	<b>Representatives</b>	<b>Total</b>
Dambwa North		6	–	–	<b>6</b>
Libuyu	8	6	–	–	<b>14</b>
Linda		6	–	–	<b>6</b>
Maramba	8	6	–	–	<b>14</b>

Norttie Broadie		6	–	–	<b>6</b>
Livingstone District Education Board Secretary		–	1	–	<b>1</b>
Livingstone District Medical Office		–	1	–	<b>1</b>
Livingstone City Council		–	1	–	<b>1</b>
Zambia Environmental Management Agency		–	1	–	<b>1</b>
Zambia Wildlife Authority		–	1	–	<b>1</b>
Professional Waste Solutions		–	–	1	<b>1</b>
Zambia Residue Exporters		–	–	1	<b>1</b>
<b>Total</b>	<b>16</b>	<b>30</b>	<b>5</b>	<b>2</b>	<b>53</b>

The total sample was therefore 53. For a small-scale qualitative research of the type carried out, a large sample size was not needed because the purpose of the research was not to draw generalizations from the findings to the whole population. The size of the sample was not determined in advance. Rather, it was determined by the amount of new insights gained into garbage disposal and its effects on human health and the natural environment from an ethical perspective. Once it was found out that the ‘saturation point’ (Glasser and Strauss, 1967) was reached whereby no new information could be obtained from observations, in-depth interviews and focus group discussions, there was no need to continue with data collection beyond the sample of 37 participants.

#### **4.5 Sampling Techniques**

Sampling was done in order to collect a small unit from the study population. The study employed both probabilistic and non-probabilistic sampling techniques to select participants. Non probability sampling methods were employed because of the need for obtaining specific information from key informants. In order to avoid bias, probability or random sampling methods were used to give each individual in the population an equal chance of being selected in the sample (Achola and Bless, 1988). This also improved the quality of the sample.

The probability methods employed in the study were multistage and lottery. Livingstone city was purposively selected. Multistage sampling is the kind of sampling which proceeds in stages. In stage 1, five townships were purposively selected involving high density or low income (Linda and Libuyu), medium density or medium income (Dambwa North and Maramba) and low density or high income (Nottie Broadie). In stage 2, all the zones in each township were numbered. The zone names were written on small identical pieces of paper. The papers were placed in a box, mixed well and shuffled. Then, two zones out of each township were randomly selected making a total of 10 zones (5x2). In stage 3, three households were selected from each zone as follows. All the households in each zone were numbered. The house numbers were written on small identical pieces of paper. The papers were placed in a box, mixed well and shuffled. Then a “lucky number” was drawn which constituted the sample. The process was repeated until the sample size was obtained for each zone. For each house drawn, the head of the house became the participant. This made a total sample of 30 households. The lottery method was favored because it was simple to use and if the targeted home had no participant available, it was easy to replace him or her by carrying out another draw for a different household. It also provided an equal opportunity of selection into the sample for each element in a population.

Non-probability purposive sampling was used to obtain specific information from five (5) key informants from ZEMA, LCC, ZAWA, DMO and DEBS, as well two (2) representatives from ZAMREX and Professional Waste Solutions. These are individuals from institutions the researcher felt could provide insightful information on garbage disposal and its effects on human health and the natural environment. Purposive sampling was also used to select sixteen (16) residents of Libuyu and Maramba Health centres for FGDs. The sample frame involved Dambwa North, Libuyu, Linda, Maramba and Nottie Broadie because they reflect stratification in terms of high density, medium density and low density localities.

In addition, non-probability convenience sampling was used to select Libuyu and Maramba health centres for the Focus Group Discussion as they are rendezvouses for Neighbourhood Health Committees.

#### **4.6 Data Collection Methods**

In the study, qualitative data was collected through primary and secondary ways of collecting data (Bless and Achola, 1988). Primary data, collected for the purpose of this study, were obtained through field work by using observations, in depth interviews and Focus Group Discussions. The data collection instruments were observation schedule, interview schedule or

guide, and a camera. Observations were used to collect data or to monitor the following: (a) incidences of littering, (b) methods of garbage disposal, (c) Indiscriminate dumping, (d) Practices such as recycling, and (e) Methods of garbage collection. An interview schedule was designed for this purpose. A camera was also used to take shorts of unsustainable garbage disposal.

In-depth interviews, were used to gather information from household heads, key informants of government institutions, and from representatives of private companies contracted to collect and dispose garbage. For the key informants, each one had a specific interview guide with sets of questions based on their mandate. For this purpose, interview guides with both open ended and semi structured and open questions were employed. This way the participants were in free to express their answers. Questions were presented to each respondent in exactly the same way to minimize the role and influence of the interviewer, and to enable a more objective comparison of results, Kombo and Tromp (2006). As for the FGDs an interview guide was used with a few questions that were posed to the discussants who discussed the questions. The role of the researcher was to facilitate and observe the group response or dynamics. The discussion was recorded by taking notes. Audio and/or visual equipment were not used in this undertaking.

The secondary data involved relevant published and unpublished researches, clinical records, books, journals, newspapers, desk analysis, that is, review of teaching materials for Grades 1-9 in public schools and the internet. These secondary data sources were used to gather information on the key elements of garbage disposal and its effects on human health and the natural environment.

#### **4.6 Ethical Considerations**

The study respected rules governing informed consent. The participants were given sufficient time to consider whether or not to take part in the study after being informed about the purpose of the study. According to Robson (2007), informed consent ensures that informants or respondents participate in the study voluntarily. Therefore, participants may refuse to participate and withdraw from the research at whatever point without any consequences. Conversely, the study may be stopped by the researcher without the consent of the participants.

The participants were also given an opportunity to ask any vexing questions about the study and they were provided with satisfactory answers to the questions. They were told how long the interviews would last, what the procedures of the research study were, and the possible benefits and risks involved in participation. Confidentiality, privacy and matters of anonymity were

adhered to (Bless and Achola, 1988). Permission was obtained to use visual equipment and participants were reassured that such materials would be secured and would not fall in the hands of others not authorised.

## CHAPTER FIVE: FINDINGS AND DISCUSSION

### 5.0 Introduction

This chapter will present and discuss the data findings with respect to garbage disposal activities being undertaken in Livingstone district and their effects on human health and the natural environment. It will also make an ethical evaluation of the findings.

### 5.1 Garbage disposal activities in Livingstone district

#### 5.1.1 Types of garbage

Observations at the various illegal dumpsites in the district showed the presence of a huge amount of hedge trimmings, plastics, broken glass and empty beverage cans in the waste stream. Figure 5.1 shows different kinds of garbage disposed of at the LCC disposal site.



Figure 5.1: Different kinds of garbage at LCC dumpsite  
Source: Field observation, June 2015

The waste stream is a composition of organic and inorganic or compostable and non-compostable waste. This correlates with the finding by Hoornweg (1999), Munthali (2006) and Pasi (2012). Hoornweg (1999) revealed that the waste stream in low income countries has a high amount of compostable organic matter. This is similar to what Munthali found to be obtaining in Lusaka. On the other hand, Pasi (2012) found that the waste stream in Kabwe had a high amount of non-compostable inorganic matter. The fact that the waste stream in Livingstone is composed of both organic and inorganic matter has several implications. The organic

component can be of use or beneficial if used as compost manure that can be used to provide nourishment to plants in gardens and minimise the amount of waste to be disposed of at dumpsites as noted by Karanja (2005). If this was to happen in Livingstone, it would help to remove illegal dumpsites that have become part and parcel of the living conditions of many residents in Livingstone. The down side of organic garbage is that it undergoes putrefaction and, when this happens, methane, a potent greenhouse gas, is produced and contributes to global warming. This phenomenon can bring about serious or irreversible negative ramifications to human health and the natural environment. The inorganic part of the waste stream is of great significance. This is because its components like glass, metal and plastics do not easily breakdown thus staying for many years in their original state to the detriment of human health and the natural environment. The inorganic part can be recycled as has been elsewhere in the study.

### 5.1.2 Responsibility for collection and disposal of garbage

When asked as to who was responsible for the collection and disposal of garbage, various views were noted as follows (Table 5.1):

Table 5.1: Responsibility for collecting and disposing garbage

Council	14 (46.7%)
Individual	9 (30%)
Both council and Individual	5 (16.7%)
Private companies	1 (3.3%)
ZEMA	1 (3.3%)
Total	30 (100%)

Source: Field data, June 2015

It was found that 46.7% of the participants felt that the council was responsible, 30% considered individuals to be responsible, 16.7% perceived both the council and the individual to be responsible and only 3.3% felt that private companies and ZEMA were responsible respectively. The group response from the FGD held with community members in Maramba revealed that the responsibility of collecting and disposing of garbage lay with the council. An interview with the Director of Professional Waste Solutions, a company engaged in garbage collection and disposal in Livingstone district, revealed that the responsibility for waste collection also lay with the

individual.<sup>1</sup> He mentioned his company's motto: "Dispose garbage our way and not your way". The researcher observed that the CBD was in fact clean with regular street sweeping and frequent garbage collection.

The finding that the responsibility of collecting and disposing of waste lay with the council is similar to that of Acurio et al. (1998) who found that communities in Latin America and the Caribbean (LAC) considered garbage management to be the municipalities' responsibility. Similar findings were noted by Karanja (2005) where the people in Nairobi saw garbage management as a public good. An official at LCC under the Solid Waste Management Unit contended that the Local authority had transport problems.<sup>2</sup> For instance, at the time of the interview, the local authority had only one refuse truck that was in operation as the second truck had mechanical problems. Although the council has four tractors for the purpose of collecting and disposing of waste, they are usually used to collect and dispose of garbage generated by commercial entities like markets and other business premises.

However, the role of the individual who produces garbage cannot be underestimated. This is because for any meaningful garbage management strategy to be effective, the public should be taken on board. This is the more reason why public involvement and participation in issues of sustainable garbage management is critical. The individual has a huge role to play in the issue of garbage management because garbage stems from lifestyle of individuals, their consumption and resource recovery decisions (Strange, 2002). Attitude change at the individual level is important if the problem of garbage disposal in Livingstone is to be addressed. The failure of individuals to accept their role or responsibility in sustainable garbage collection and disposal raises an ethical issue to be considered later.

The study revealed that one way of addressing the problem of garbage disposal and collection was to involve the private sector. Accordingly, the LA has engaged four private companies for this purpose. These companies collect garbage in commercial and residential areas. A Zambia Residue Export (ZAMREX) official pointed out that LCC collects garbage in all commercial premises along Mosi-oa-Tunya road where Shoprite and Spar supermarkets are located.<sup>3</sup> This has led to acrimony between ZAMREX and LCC. The reason for this animosity is that LCC has gone for clients that pay high charges and do not default while ZAMREX is left to collect from poor individual households with a high likelihood of defaulting. In Dambwa North,

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<sup>1</sup> Personal communication, 27<sup>th</sup> May, 2015

<sup>2</sup> Personal communication, 25<sup>th</sup> May, 2015

<sup>3</sup> Personal communication, 28<sup>th</sup> May, 2015

householders pay ZMW 30 per month so that garbage is collected on an appointed day, usually once in a week. The Director of Professional Waste Solutions was of the view that this charge was too low if they were to remain in business.<sup>4</sup> He argued that it would have been better if he was given leeway for negotiating with the people on coming up with a more reasonable fee. This suggestion reflected a willingness to involve the public in garbage management. According to the Proprietor of ZAMREX, a private garbage management company, the fees as stipulated in the Government Gazette dated Friday, 8<sup>th</sup> November, 2013 are too low to make any economic sense.<sup>5</sup> The result is that those areas classified as low cost, like Linda and Libuyu, are not serviced by any of the garbage collection companies because the ZMW 10.00 per month charged for each household was too little. As a result no scheduled collection is carried out in these areas. Group think of the Focus Group Discussion held with community members in Libuyu Township revealed that there were no organised garbage collection services in the locality. Collection and disposal services are only done when the stakeholders cry foul. This is similar to what Karanja (2005) found out in Nairobi where many residents in low income areas did not have garbage collection services whereas their counterparts in middle and high income localities were serviced by garbage collection companies. Whilst the residents in high density or low cost areas live with garbage in their midst and streets that were unkempt, the CBD together with Mosi-oa-Tunya Road were kept clean. The shop corridors had refuse bins and sweeping along the road is done almost daily. When asked as to why this was so, the official from LCC pointed out that this was because Livingstone was the tourist capital.<sup>6</sup> The finding that garbage collectors in Livingstone concentrate on affluent parts of the district is similar to that found by UNDP (2008) and UN-HABITAT (2009), namely, that the city council places more emphasis on the town centre and hospitality industry as regards garbage collection. As for less affluent localities, garbage collection and disposal services are only called upon when critically needed. Masocha (2004) made similar observations with regard to Victoria Falls Town in Zimbabwe where garbage was collected more frequently in the CBD and from hotels while in the less affluent areas collection services were less frequent.

ZEMA is the body legally mandated to provide oversight on issues of garbage. An inspector at ZEMA in Livingstone noted that the role of ZEMA was to licence entities involved

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<sup>4</sup> Personal communication, 27<sup>th</sup> May, 2015

<sup>5</sup> Personal communication, 28<sup>th</sup> May, 2015

<sup>6</sup> Personal communication, 25<sup>th</sup> May, 2015

in waste collection and transportation.<sup>7</sup> This includes the siting of dumpsites and the transportation of garbage to the dumpsites. Its regulatory role also involves attending to private companies that run garbage dumps like the one operated by Sun International Hotels. Another of its roles is to receive and attend to complaints which may come from organisations or individuals. The ZEMA inspector further argued that the LA was not able to fulfil its mandate of collecting and disposing of garbage because of challenges such as lack of transport, funding and manpower. Furthermore, the council had not been submitting annual reports on the types of waste and the quantity of each type generated and disposed of within its jurisdiction and did not prepare and submit an integrated waste management plan to the Agency for approval. This is a problem that needs addressing because lack of appropriate data leads to inadequacies in addressing the challenges the district is facing in garbage collection and disposal. The lack of appropriate data in Livingstone is like what was obtaining in Kampala, Uganda (OAG, 2010) where KCC was not updating the database on garbage collection and disposal. This resulted in plans being made based on an inaccurate assessment of garbage being generated and adequate funds for garbage management activities not being provided.

Although ZEMA is the body with the mandate to provide oversight on matters of an environmental nature in the country, its presence in Livingstone, however, has not helped much as improper disposal of garbage continues to be the order of the day. This is in part due to the inept of the local authority that is not implementing its role as enshrined in the Environmental Management Act of 2011. Observation also revealed that no skip bins were placed in strategic places. The responsibility of collecting and disposing of garbage is everyone's business. Each of the entities cited above has a role to play in ensuring that garbage is sustainably disposed of although the kind and degree of involvement will vary as has been elucidated above.

### **5.1.3 Garbage disposal methods**

Table 5.2 shows responses of householders on garbage disposal methods. The majority 36.6% felt dispose of garbage by way of putting it in a receptacle, a tin or a sack, 20% make use of refuse pits, 16.7% burn their garbage, 16.7% place it in an illegal dumpsite and only 10% have their garbage collected by private companies.

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<sup>7</sup> Personal communication, 25<sup>th</sup> May, 2015

The dominant response from the Focus Group Discussion held with participants from Maramba on disposal of garbage was to put the waste in sacks and take them to a disposal site when full.

Table 5.2: Garbage disposal methods

Receptacle	11 (36.6%)
Refuse pit	6 (20%)
Burning	5 (16.7%)
Illegal dumpsite	5 (16.7%)
Private company	3 (10%)
Total	30 (100%)

Source: Field data, June 2015



Figure 5.2: Compressor for plastic bottles  
Source: Field data, May 2015

Field observations revealed that a company called ZAMREX was involved in the recycling of garbage as a disposal method (Figure 5.3).The proprietor of ZAMREX noted that their major client, Sun International Hotels, insisted on garbage being handled in a particular way for



Figure 5.3: Bales of compressed plastic bottles  
Source: Field data, May 2015

purposes of environmental sustainability.<sup>8</sup> Consequently, garbage generated within its premises is separated into various types like plastics, paper and cardboards, glass bottles and food remains. Whereas the organic or decomposable part is transported to the dump site run by Sun International Hotels the inorganic material like plastics and paper is compacted using a compressor as shown in Figure 5.4 above. The compacted garbage is later sent to South Africa for processing. He bemoaned, however, the lack of a market in Zambia for recyclable garbage. He further pointed out that Sun International Hotels regularly conducts training sessions for those who are charged with the responsibility of handling garbage generated within their premises. The ZAMREX official also noted that prior to the United Nations World Tourism Organisation (UNWTO) General Assembly in August, 2013, Shoprite used to be serviced by ZAMREX but was subsequently taken over by the LCC's Solid Waste Unit. At present, Shoprite does not demand stringent measures such as the separation of garbage into different kinds and its compression as do the Sun International Hotels, a practice that is more involving and demands some level of technical capacity in compressing garbage which the LA does not have. However, it is of the utmost to note that at the household level, garbage minimisation and

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<sup>8</sup>Personal communication, 28<sup>th</sup> May, 2015

reuse do not need any technical knowhow to be implemented. What is required is to have moral virtues or character dispositions that promote the wellbeing of the environment. The finding of the study that ZAMREX has employed recycling as a method of garbage disposal is similar to that made by Masocha (2004) in the case of Victoria Falls Town where garbage was also being disposed of by way of recycling.

Another good method of handling garbage is by having skip bins placed in strategic places. There are no skip bins provided for disposal of garbage in Livingstone. This is a big omission on the part of LCC. Skip bins act as a means of temporal storage of garbage as it awaits transportation to the central dump or landfill. The absence of these in strategic places like markets results in garbage being disposed of unsustainably.

It is clear from the above data that garbage disposal methods as practiced in Livingstone are rudimentary and unsustainable. The finding of the study that the majority disposed of garbage unsustainably is similar to that made by Munthali (2006). Garbage should be managed following the procedure of the 3Rs, namely, reduce, reuse and recycle. These are standard operating procedures that everyone involved in the business of garbage is obliged to follow. It was observed that at David Livingstone Secondary School, garbage is separated into two receptacles labelled red waste and green waste for non-biodegradable and biodegradable garbage, respectively (Figure 5.5). However, when the LCC vehicle comes to collect the garbage, the garbage from the red bin and from the green bin is mixed together and transported to the dump site where it is indiscriminately dumped thus defeating the whole purpose of source separation.



Figure 5.4: Garbage receptacles at David Livingstone School  
Source: Field data, May 2015

#### 5.1.4 Effectiveness of the garbage disposal regulatory framework in Livingstone

All 30 of the householders interviewed felt that the regulatory framework was not effective. The group feeling of the Maramba FGD also revealed that the garbage disposal regulatory framework was not effective. Similarly, participants in the FGD held in Libuyu unanimously revealed that the garbage disposal regulatory framework was ineffective. Observations in the field showed that residents indiscriminately disposed garbage without fear of being prosecuted (Figure 5.6) an indication of non-enforcement of the regulations.

A key informant from LCC pointed out that although the LA has the mandate of regulating the collecting and disposing of garbage (GRZ, 2011b), it has difficulties in implementing this mandate as promulgated in the Environmental Management Act, 2011.<sup>9</sup>



Figure 5.5: A Maramba resident disposing garbage  
Source: Field data, June 2015

LCC has an enforcement department and as such those who break the laws should be brought to book. Failure of the local authority to fully implement its role in waste management and to operationalize the Act regarding offenders has led to the rampant illegal disposal of garbage in Livingstone. This is similar to what was obtaining in Kampala in 2007 where failure of the KCC to enforce the provisions of the solid waste management ordinance 2000 resulted in

<sup>9</sup> Personal communication, 25<sup>th</sup> May, 2015

the public engaging in unsustainable garbage disposal practices (OAG, 2010). People disregarded well intended “no dumping” sign posts largely due the ineptitude of KCC in enforcing the law governing garbage disposal.

The Director of Professional Waste Solutions pointed out that the LA was not implementing guidelines, especially those that had to do with prosecuting those that dispose of garbage unsustainably at the household level.<sup>10</sup> Consequently, solutions that would help to decisively deal with the garbage problem in the city remain elusive. People are at liberty to dispose of garbage at illegal dump sites without fear of being prosecuted. Weak enforcement of by-laws was cited as being responsible for the inability of Nairobi City Council to efficiently and effectively monitor and enforce the collection, transportation and disposal activities of garbage management companies (Karanja, 2005). The director of ZEMA had implored LAs to implement good waste management practices (Mbulo, 2015). He further reiterated the need for change in the attitude of people with regard to garbage disposal and emphasised that those found indiscriminately disposing of garbage could be fined ZMW 10, 000. A key informant at ZEMA clarified that when a complaint is received, the Agency will first of all sensitise those involved. If the offending party continues with the practice, then a legal process will be initiated. For instance, the Zambia Daily Mail of 24<sup>th</sup> May, 2015, carried a story of an 81 year old Livingstone businessman who was convicted for indiscriminately dumping waste from his premises (Mulenga, 2015). This occurred in the central business district an area that is given priority as regards garbage collection and disposal. It appears that those concerned were moved into action because of the location where the garbage was indiscriminately disposed of. As for those who carelessly dispose of garbage in the high density or low income localities the practice goes unpunished.

Both the official at the LA and the Director of Professional Waste Solutions noted that companies that collect and dispose garbage are supervised by the local authority. This is on account of the licensing they get from ZEMA, payment of a franchise and the use of dump site fees. The official of ZAMREX argued that the interaction with the council only goes as far as the payment of fees is concerned. The sound management of garbage from the point of collection to the disposal site is not part of the contract. It is not surprising, then, that private companies in Livingstone do not follow garbage disposal practices as stipulated in the Environmental Management Act of 2011 as they go about the business of collecting and

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<sup>10</sup> Personal communication, 27<sup>th</sup> May, 2015

disposing garbage. Since LCC is supposed to collect and dispose of garbage but does not follow disposal guidelines as stipulated in the National Solid Waste Management Strategy for Zambia, it would appear that this has clouded their supervisory role. A similar situation was found in Nairobi (Karanja, 2005) where companies violate laws concerning the disposal of garbage and operate without supervision, monitoring and regulation.

From the data given by household interviewees and contributions from various key informants, it is clear that the regulatory framework designed to address the problem of garbage disposal in Livingstone is not being implemented as intended. The non-implementation of the dictates and stipulates of the garbage disposal regulatory framework is a clear indication that any meaningful change in garbage disposal practices and policies requires a significant change in people's attitudes toward the environment.

### **5.1.5 Awareness and education about garbage disposal activities in Livingstone**

Interviews with the 30 household heads revealed that 27 were not aware of any awareness programmes concerning garbage disposal in Livingstone. Similar group responses were given by the FGD held with community members in Maramba. Participants in the FGD in Libuyu were unequivocal with regard to the lack of awareness programmes in their locality. Lack of awareness on issues related to the disposal of garbage was also found to be a problem in Uganda (OAG, 2010). For example, the KCC reneged on its responsibility of educating the public on garbage management issues despite this being a requirement by law. Non-adherence to this requirement contributed to the unsustainable disposal of garbage in Kampala to the extent that residents would even dispose of garbage at places that bear sign posts with prohibition messages.

Success in garbage management largely depends on the level of popular awareness and enlightenment of the public (Zhu et al., 2008). This is because an informed citizenry will tend to adhere to the dictates and stipulates of a garbage management system. Public awareness of, and attitude toward waste can affect the entire solid waste management system because all steps in solid waste management (that is, from household waste storage to waste segregation, recycling, collection frequency, amount of littering, willingness to pay for services, and opposition to the siting of treatment and disposal facilities) depend on public awareness and participation (ibid, 2008). In Livingstone, messages about keeping the district clean were frequently broadcast on a local radio station, and a garden competition was run where residents were encouraged to participate. The message, however, was only broadcast in English with the result that only those

who understood English took part in the competition thus perpetuating wanton disposal of garbage in many parts of Livingstone district.

The Director of Professional Waste Solutions stated that the community response to waste management issues was not encouraging.<sup>11</sup> In his words, “it is an uphill battle.” He said that the major reason why this is so was that the council was not playing its role in a satisfactory manner. For instance, there was no sensitization of the community on matters of garbage management. He, therefore, suggested that the LA should have a programme designed to raising awareness in the community. He further contended that educating the people on garbage management was the key to ridding the surroundings of uncollected garbage. A number of methods have been identified to raise levels of public awareness (ibid.). These include door to door awareness and motivation programs, celebration of major occasions, rallies, street plays, clean up drives, signature campaigns, open forums, school programs, involvement of national cadet corps, national social service and scouts, involvement of religious leaders and women associations, best garden competitions, and mass communication methods.

The District Education Standards Officer (DESO) noted that there was no specific subject that deals with the environment as a stand-alone.<sup>12</sup> However, he added that environmental issues are dealt with in subjects like integrated science and social studies. He further noted that in the new curriculum, environmental issues would be more conspicuous. A critical look at the Integrated Science Syllabus for grades 1-7 in Unit 13 under the title, “The Environment”, reveals that issues on the environment are taught (GRZ, 2013b). For instance, those in grade 1 are taught about the features of the local environment and the importance of the environment. Grade 2 pupils are taught about harmful things, wastes, and the effects of harmful things on the environment. They are also taught about keeping homes and schools clean and caring for their surroundings by cleaning. In Social Studies in grade 6, pupils are exposed to issues on the environment (GRZ, 2013c). For instance, under protection of the environment, learners are required to identify ways of disposing waste and communal places that need protection from waste. They are also required to describe the role of the community in environmental protection and waste management. Ultimately, learners are required to engage in community participation, sensitization and advocacy. Facts on the ground indicate that this is not being done. Furthermore, the learners are not being followed to ascertain whether they engage in these noble acts designed to protect the environment.

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<sup>11</sup> Personal communication, 27<sup>th</sup> May, 2015

<sup>12</sup> Personal communication, 25<sup>th</sup> May, 2015

Some of the garbage disposal methods that learners will be taught include the recycling and burying of waste. Burying of garbage, however, is unsustainable as it will eventually affect the environment negatively (USAID, 2014; Myers & Raffensperger, 2006). It should also be noted that whereas the “Zambian Environment” is taught in grade eight, it is not taught in grade nine. If it is taught in grade nine this would reinforce the message about the environment being imparted on the learners. This way character dispositions that promote the wellbeing of the environment will be fostered.

Whereas issues relating to the environment are taught as units in social studies and integrated sciences, this is clearly not enough! It is not enough because the other twelve units that do not deal with the environment will crowd out the one and only unit on the environment. There is need for the learners to be exposed to environmental education that also requires knowledge of some of the possible effects on environmental and human health posed by garbage that is improperly disposed of that would warrant the institution of precautionary measures. For issues of garbage management, and indeed other environmental issues to be well comprehended, there should be a subject specifically devoted to the environment and not taught in piecemeal terms as the case is at present. This should be taught at all levels of the school system.

#### **5.1.6 Involvement in decision making concerning garbage disposal and collection**

All householders felt that the local authority did not involve them in decision making concerning garbage collection and disposal. Participants in the Maramba FGD clearly showed that they were not being involved in decision making on such issues. In Libuyu, participants in the FGD explicitly lamented their non-involvement in decision making by the LA. The inspector at ZEMA in Livingstone also noted that the community was not involved in coming up with solutions to the garbage problem. The LCC does not involve the residents in decision making process regarding garbage management problems. Hence, the people of Livingstone do not appreciate public participation as a means through which the problem of garbage disposal and collection could be solved. Non-involvement of the public in issues of garbage disposal is similar to the finding of Acurio et al. (1998) who noted poor community participation with regard to problems of garbage management in Latin America and the Caribbean.

Public participation in environmental issues is critical. The term “public participation” includes any of a variety of mechanisms and processes used to involve and draw on members of the public or their representatives in the activities of public-sector or private-sector

organizations that are engaged in informing or making environmental assessments or decisions (Dietz and Stern, 2008; Cox, 2010). Public participation in matters of garbage disposal is critical to the success of garbage management programs. When involved at all levels of decision making, the community will have that sense of ownership of an undertaking. This view is supported by Cox (2010) who found that public participation, when done well, improves the quality and legitimacy of a decision and can lead to better results in terms of environmental quality. Mahadevia et al. (2005) similarly agree that when channels of communication between the authorities and stakeholders are open, an enabling environment for sound garbage management practices is created.

Participation of the public in environmental issues was highlighted at the Rio de Janeiro Earth Summit in 1992. The Action Plan for sustainable development stressed that the most effective planning evolves gradually through a participatory process that allows different groups to debate the gains and losses in reconciling development and environment (Reid, 1995). However, public participation seems to elude many. In an attempt to show that there is public engagement in environmental issues, some have even gone to the extent of conducting sham public participation processes that do not allow for adequate public engagement (Seelinger and Hattingh, 2004).

## **5.2 Perceived Effects of Garbage Disposal on Human Health in Livingstone**

Diarrhoeal diseases are associated with improper disposal of garbage. Table 5.3 gives a summary of the responses of householders with regard to their perceptions of the diseases likely to be caused by improper waste disposal. Group responses from the Maramba FGD clearly revealed that diarrhoeal diseases were foremost among the effects of garbage on human health. In Libuyu, malaria and diarrhoeal diseases were mentioned in an equal measure by the FGD participants as being the effects of unsustainable disposal of garbage on human health.

Table 5.3: Perceived effects of waste on human health

Cholera	15 (50%)
Dysentery	6 (20%)
Malaria	5 (16.7%)
Respiratory Tract Diseases	3 (10%)
Worms	1 (3.3%)

Total	30 (100%)
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Source: Field data, June 2015

Cholera is a severe acute gastrointestinal infection caused by the germ *Vibrio cholera* and is characterised by severe diarrhoea without pain followed by vomiting which begins suddenly (Colledge et al., 2014). Dysentery is an acute inflammation of the large intestine characterised by diarrhoea with blood and mucus in the stools (ibid.). Its causes are bacillary or amoebic infection. Improper disposal of garbage is implicated in this because houseflies pick up pathogens from the garbage that is indiscriminately dumped and they settle on food meant for human consumption. After ingesting such contaminated food, an individual can be infected resulting in diseases like cholera and dysentery. The finding of this study that improper disposal of garbage can cause diseases is in agreement with the findings of Masocha (2004) that increases in diseases like malaria and dysentery were attributed to waste dumps which provide ideal breeding conditions for such vectors as mosquitoes and houseflies. Similar findings were noted by Sichaaza (2012) and Pasi (2012) that a dirty environment causes diseases such as cholera, dysentery and coughs. The District Community Medical Office noted that the district had experienced several outbreaks of cholera in the past decade.<sup>13</sup> Such outbreaks of disease deter tourists from visiting the tourist capital. Each time there was an outbreak, foreign governments issued travel advisory notices which resulted in cancellations of earlier booked trips to the tourist capital. Outbreaks of cholera also change the behaviour of society. For example, people are advised not to show gestures of intimacy like handshaking or hugging in the wake of a cholera outbreak. Outbreaks also lead to realignment of resources as health centres are converted to cholera centres which inevitably results in residents of that locality having to seek health services elsewhere. Conflicts with members of staff on the cholera rota can also arise as they demand payment for services rendered during the exercise. Cholera can also disrupt social harmony when there is a death because at such times, relatives are not allowed to touch or bury their dead. This is a public health measure designed to contain the transmission of the disease.

Human malaria is caused by *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale*, and *Plasmodium malariae* (Colledge et al., 2014). It is transmitted through bites from female anopheles mosquitoes. A key informant at the District Medical Office noted that malaria causing mosquitoes seek sanctuary in water-filled garbage where they breed and multiply. They

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<sup>13</sup> Personal communication, 26<sup>th</sup> May, 2016

lay their eggs in the still water e.g. in empty cans. Furthermore, the key informant pointed out that garbage that is improperly disposed of acts as a launch pad for mosquitoes causing malaria and that malaria used to be one of the leading causes of morbidity and mortality in Livingstone although of late it has not been a menace to the community. This is because of the interventions put in place designed to combat the disease. These measures include the use of insecticide treated bed nets, prompt examination of patients suspected to have malaria with rapid diagnostic tests, indoor residual spraying of dwelling places, and the use of combination artemisin-based malaria treatment drugs. Malaria as a disease can lead to loss of productivity when an individual is infected because the hours that one stays away from work contribute to a decline in the country's Gross Domestic Product.

Improperly disposed of garbage can also cause respiratory tract diseases. When plastics and other rubberised materials are burnt, they produce substances like dioxins. Dioxins are carcinogenic or cancer causing when persistently inhaled. Fumes produced from burning or smouldering plastic can trigger an asthmatic attack. A resident of MB area in Maramba compound said that he was a victim of garbage that is improperly disposed of. He said that since his house was very close to a garbage dump, he developed breathing problems as a result of the burning of tyres and plastics at the dump. Masocha (2004) has noted that improper disposal of garbage like burning is associated with respiratory tract diseases because most products of combustion like dioxins when inhaled can cause diseases like bronchitis.

### **5.3 Perceived effects of Garbage Disposal on the Natural Environment in Livingstone**

Table 5.4 shows the responses of the 30 householders to their perception of the effects of waste on the environment. Only 6.7% of the interviewees said they were not sure as to what effect improper disposal of garbage could have on the environment.

Table 5.4: Perceived effects on the environment

Air pollution	7 (23.3%)
Water contamination	6 (20%)
Soil contamination	6 (20%)
Aesthetic inconveniences	5 (16.7%)
Land degradation	2 (6.7%)
Not sure	2 (6.7%)
Blockage of drainages	1 (3.3%)

Climate change	1 (3.3%)
Total	30 (100%)

Source: Field data, June 2015



Figure 5.6: Blocked drainage in Linda area  
Source: Field data, April, 2015

Group responses from the Maramba FGD largely pointed to air pollution and contamination of water and soil, aesthetic inconveniences and land degradation as some of the impacts of improper disposal of garbage on the natural environment. Participants' sentiments shown by Libuyu FGD were much the same as those for Maramba. However, the issue of unattended garbage being unsightly and having a bad or foul smell came out much stronger. The researcher observed that improper disposal of garbage can cause blockage of drainages (Figure 5.7). Garbage that is disposed of along the streets creates blockage of drainages in the rainy season. When drainages get blocked the flow of water is disturbed. Residents of Linda compound spoke of very dirty water flowing into their yards due to the blockage of drainages. Children are subjected to health risks by playing in the drainages. Adults are inconvenienced by having to wade through this water to get in or out of their houses. OAG (2010) also noted that improperly disposed of garbage caused blockage of the drainage systems which contributed towards epidemics such as cholera around the city slum areas and suburbs of Kampala.

Unsustainable disposal of garbage can lead to air pollution if disposal methods like burning are used. When garbage burns, smoke is released into the atmosphere thus contaminating the air. At dumpsites like the LCC's designated one in Livingstone, smoke from

the burning and smouldering garbage is a permanent feature. Smoke from dump sites has the potential to cause despoliation of the natural environment although the effects may not be felt in the immediate environment. The smoke so released contains substances like carbon dioxide which can contribute to air pollution. Furthermore, as garbage decomposes, it produces substances that are unpleasant like methane which is more harmful than carbon dioxide to the environment. Disposing garbage through burning produces ash that contains toxic substances that mix with rain water which may eventually find itself in water bodies like rivers and streams (USAID, 2014).

Ground and surface water are a source of potable water for human and non-human life. If tainted by garbage that is improperly disposed of, life forms can be threatened. The LCC dumpsite covers a large surface area and is located near a natural water source (UNDP, 2008). Hence, humans and non-humans downstream could be consuming water that is highly contaminated. The environment can also be compromised by way of soil contamination. Crops that are grown in such soils could be harmful to human health and animals. The effects of such poisoning may manifest many years later after the initial contact as the poison will run in the food chain.



Figure 5.7: Contents of a garbage pit at Maramba Clinic  
Source: Field data, May 2015

Improper disposal of garbage can lead to water pollution. This can occur if garbage is disposed of through burying. In this way, ground and surface water can be contaminated by way of garbage streams bleeding toxic materials and pathogenic organisms into the leachate of

dumps. Mengo (2014) argues that many mothers throw away used baby diapers with other solid wastes generated by households and these eventually end up at dump sites. Since the dump sites in Livingstone are not lined, the seepage or runoff that results thereof can contaminate ground or surface water. Figure 5.8 shows a garbage pit that is not lined at Maramba clinic. The contents of the pit include; used disposable gloves, used syringes and needles, specimen containers (blood, urine, and so on), and plastic of all sorts. This kind of a disposal of medical waste will lead to contamination of soil and water.

Garbage that is improperly disposed of can also harm animals. A key informant at the Zambia Wildlife Authority (ZAWA) in Livingstone pointed out that wanton disposal of garbage affects pasture in that it is reduced.<sup>14</sup> He also said that deaths of wild animals as a result of ingesting plastics had been recorded in Mosi-oa-Tunya National Park and that autopsies conducted on dead animals had confirmed this. He further noted that some wild animals had sustained injuries resulting from broken glass and that, in certain instances, wild fires could result from pieces of glass reflecting the heat of the sun and thus igniting a fire. Wild fires destroy the vegetation on which animals feed and they can also kill animals directly. The fact that unsustainable disposal of garbage can cause harm to animals is also noted by Masocha (2004) in that animals, especially baboons, scavenge at the municipal dump site as a major source of food. He noted that some baboons were seen limping or had visible wounds resulting from burns and cuts inflicted by burning garbage or hot ash and sharp objects like broken glass. Feeding from the dumpsite also brings scavenging baboons in contact with human scavengers which can lead to human animal conflict.

#### **5.4 Ethical Evaluation of Findings**

The previous sections of this chapter presented the findings and discussion of the study on garbage disposal and its effects on human health and the natural environment. The findings revealed that many household heads in Livingstone understand what garbage is. The garbage generated consists of a wide variety of items such as leaves, paper, plastics, diapers and left-over food. The garbage generated is not sustainably disposed of. The effects of garbage disposal on human health were perceived to be cholera, dysentery, malaria and respiratory tract diseases. Effects on the natural environment included blockage of drainages, water contamination, air pollution, soil contamination and general untidiness. It was also found out that the local

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<sup>14</sup> Personal communication, 4<sup>th</sup> August, 2015

authority was not implementing the Environmental Management Act, 2011 with regard to garbage management. Furthermore, it was made clear that no meaningful awareness of the harmful effects of poorly disposed of garbage was available to the public and that the public did not participate in decision making with regard to problems of garbage management in the city. This section will evaluate the findings on garbage disposal and its effects on human health and the natural environment in Livingstone district using the Land Ethic, the Precautionary Principle and Environmental Virtue Ethics.

#### **5.4.1 The Land Ethic Perspective.**

The Land Ethic focuses on the whole ecosystem which, in this case, is the city of Livingstone. From the perspective of the Land Ethic, garbage disposal practices obtaining in Livingstone contribute to the ill-health of both humans and the natural environment. It holds that an action is morally right if and only if it preserves the integrity, stability and beauty of the ecosystem. The Land Ethic is in this sense an environmental ethic that takes into account the ecosystem in its entirety.

Garbage that is improperly disposed of brings with it a whole host of challenges. First, it disrupts the interdependence of the elements in the environment. These elements combine in such a fashion that they create a closely knit harmonious whole. However, quite the opposite is happening in Livingstone where only a section of the district is given priority in terms of garbage collection and disposal. Cleaning only the CBD and collecting garbage from the affluent parts of the district goes against integrity. The Land Ethic demands that all parts of the district be devoid of uncollected garbage. Garbage disposal practices in Livingstone contribute to the distortion of the beauty of the environment. The heaps of garbage that lie uncollected in the streets of Livingstone are unsightly. People living close to an uncollected heap of garbage have to put up with an incessant odour produced by rotting garbage. Those passing by such places are not spared either. Oftentimes one would see people covering the noses and mouths with their hands. This is all in an effort to avoid the nauseating foul smell.

Garbage that is disposed of in an unsustainable way also disrupts the equilibrium of the ecosystem in other ways. For instance, it contributes to water pollution, soil contamination and air pollution. In the light of this, the flora and fauna in the areas surrounding the dump sites are affected. For example, the plants that grow in soils that are contaminated will absorb toxins from the seepage. Through the process of photosynthesis, these plants will produce nourishment that is tainted. Herbivorous animals will then feed on these plants. Carnivores will then feed on

these animals. This process is what Leopold refers to as the biotic pyramid, a system of energy capture and transfer (Wenz, 2001). This disruption in the biotic pyramid invariably creates disharmony which in the final analysis affects the stability and sustainability of the whole ecosystem.

At dump sites like the one in Livingstone, smoke from the burning and smouldering garbage is a permanent feature. Smoke from dumpsites has the potential to cause despoliation of human health and the natural environment. Oftentimes the effects are not felt in the immediate environment. Natural environments are not subject to observing boundaries on account of the manner in which all living and non-living forms are interconnected in the ecosystem (Wenz, 2001; Palmer, 1997; O'Murchu, 2003). The particulates of the smoke could be transferred to places far and beyond the bounds of Livingstone where the effects will be manifested. In this way, the integrity and stability of the ecosystem are affected.

#### **5.4.1 The Precautionary Principle Perspective.**

Although many people in Livingstone have some understanding of the negative impact of poorly disposed of garbage on both the human and the natural environment, the level of awareness is by no means adequate. For example, many noted that improperly disposed of garbage can contribute to one being afflicted with disease. These diseases have the potential to wreak havoc at the individual, community and national levels. However, despite the people knowing the effects of improper disposal of garbage on human health and the natural environment, garbage still continues to be disposed of unsustainably on an unacceptable and hazardous scale. For instance, many residents of Livingstone knew that callous disposal of garbage was illegal. They felt, however, that what was important was to rid their yards, their immediate environment so to say, of garbage. This is a clear portrayal of a lack of knowledge on the effects of garbage that is improperly disposed of. What they do not know is that improperly disposing of garbage in places other than their yards could later come to have serious unforeseen consequences. To them keeping garbage away from their yards is what matters. For them, this is an adequate precautionary measure as regards garbage disposal.

From the perspective of the precautionary principle, garbage disposal practices in Livingstone are unethical. The precautionary principle states that in cases of serious or irreversible threats to human health and the natural environment, scientific uncertainty should not be used as a reason to postpone preventive measures (Martuzzi and Tickner, 2004). In Livingstone, one method of garbage disposal is through the digging of pits which are levelled

off with a layer of soil when filled. The burying of garbage in this fashion has several ramifications. First, in the waste stream there is plastic, a non-biodegradable material that lasts for decades. Eventually, the plastics will breakdown to their constituent hydrocarbons and these will contaminate the soil and possibly escape into water bodies. This will have an effect on the health of humans, non-human life and the natural environment. Second, other things in the waste stream like used batteries, insecticide canisters, empty containers of lotions and others of the sort may eventually leak the chemicals into the soil. In this way, the leachate or seepage could contaminate water sources, both surface and underground. This too has the potential to cause harm to human health, non-human life and the natural environment. Third, the practice of disposing of garbage through burying, as is the case at health centres, is a health hazard. The waste stream contains used needles and syringes that remain a potential threat for many years. Some people at Maramba health centre have found themselves victim to this. They have been pricked by needles buried many years back as they went about digging on ground previously used as garbage pits.

Another way in which garbage is disposed of is through burning. The rationale behind burning is to reduce the volume of garbage. Burning is unsustainable. For instance, as already noted, when garbage is burnt, it produces substances which may include dioxins. If inhaled, these can harm human health, the effects of which may manifest long after exposure. They may lead to the development of chronic respiratory diseases. They may also trigger asthmatic attacks. The burning of garbage also produces gases like carbon dioxide and carbon monoxide and others. When the organic part of the waste stream decomposes, methane, a potent greenhouse agent is released. This contributes to the greenhouse effect as does CO<sub>2</sub> and CO. The difference however is that methane is 21 times more potent than CO<sub>2</sub> (USAID, 2014). The inorganic part of the waste stream consists of many things which are detrimental to the health of humans, non-human animals and the natural environment.

Even garbage that eventually finds itself at the central dump site is not innocuous. It poses a threat to the health of humans, non-humans and to the natural environment. The dumpsite itself is not lined and garbage is disposed of indiscriminately. The rotting garbage, the smouldering fires, the bellowing smoke, the sight of scavengers and waste pickers have become a perennial feature that characterise this place. As such, the impending threats and harm to the health of humans, non-human animals and the natural environment cannot be ignored. In addition, there is the air pollution resulting from the smouldering and rotting garbage, the

pollution resulting from runoff and the injustice to the flora and fauna resulting thereof. Once again, the effects of this are not immediately manifested in many instances. Future generations are the ones that may bear the brunt.

Worthy of note is the issue that what is emphasised is diseases that arise due to infection as opposed to congenital diseases that may arise. According to Myers and Raffensperger (2006), what is becoming increasingly common, are chronic diseases and conditions like cancer, asthma, birth defects, developmental disabilities, diabetes, and others of the sort. Furthermore, considerable documentary evidence, in laboratory animals, wildlife and humans, has indicated a link between levels of environmental contamination and malignancies, birth defects, reproductive problems, impaired behaviour and impaired immune system function. Granted, serious evident effects such as endocrine disruption and cancer cannot be linked to a single cause with certainty (ibid, 2006). This is because of the near impossibility of attaining scientific standards of certainty when causes and outcomes are multiple; latent periods are long; timing of exposure is crucial; unexposed or control population do not exist; or confounding factors are unidentified. The dying off of plant and animal species, the destruction of ecosystems, the destruction of the stratospheric ozone, and the likelihood of global warming are some of the other warning signs of uncertainty that could arise as a result of the environment being contaminated (ibid). Clearly, there is uncertainty about unsustainable disposal of garbage on human health and the natural environment.

In view of the foregoing, it is critically important that precautionary measures are designed to prevent the effects of improper disposal of garbage. These measures must not be of a knee jerk type. They should be something that is part of our lives and should guide our lives in all our daily endeavours (Smith, 2000). Having a precautionary mind-set enables us to avert foreseen and unforeseen harm.

In Livingstone, policies and regulations designed to ensure that garbage is sustainably disposed of are available. However, the problem is that they are not being enforced and implemented by the LA. Non-enforcement and non-implementation of regulations has resulted in garbage being disposed of indiscriminately in many parts of the city. The result is that human health and the natural environment are seriously threatened. In view of this, the precautionary principle should be called upon in ensuring that policies and legislation as enshrined in the Environmental Management Act of 2011 are enforced.

Most of the effects of improper disposal of garbage usually manifest long after one has come in contact with the offending agent. The fact that these effects take a long time to be appreciated or to manifest gives us all the more reason why precautionary approaches should be embraced. With regard to improper disposal of garbage, there is a real potential for harm and uncertainty about the extent of the effects on human health and the natural environment should not prevent action from being taken (Gardiner, 2006). In light of the real threat of harm to the human and natural environment, the application of the precautionary principle is fully justified.

### **5.4.3 The Virtue Ethics Perspective**

Just as virtues are important in the manner in which people relate to one another, so environmental virtues are important in the way in which people relate to the natural environment. Virtues are about an individual's character. They are about the kind of person that one is, or wants to be. As Pojman has expressed it, virtue is about the character traits that make one a good person and that seek to produce excellent persons who act well out of spontaneous goodness and serve as an example to inspire others (Pojman, 2002). Environmental Virtue Ethics provides guidance on what attitudes and dispositions we ought, and ought not to have regarding the environment. In this case, we are talking about character disposition in issues relating to garbage disposal. For example, improper garbage disposal which is manifested in the damage and degradation of the natural environment is perceived as detracting from virtue and involves actions, dispositions and traits that a virtuous person endeavours to avoid, resist and eliminate (Elliot, 1996).

Those who dispose of garbage in an unsustainable way will do well to answer the question, "What sort of person ought I to become regarding garbage disposal and the environment?" Garbage disposal as practiced in Livingstone lacks appreciation of environmental virtues. Environmental Virtue Ethics requires that people perform good actions and have the right character dispositions regarding the environment. These dispositions or character traits can include the following: wonder, sensitivity, respectfulness, appreciation and gratitude. The unsustainable way in which garbage is disposed of does not conform to these virtues. Disposing of garbage through burying, open burning and open disposal are not the kind of actions that promote the wellbeing of the environment. The character dispositions or attitudes of those involved in the practice are a portrayal of deviant conduct (Sandler, 2010). They rather reveal character dispositions or habits of insensitivity and indifference towards the environment.

One way in which virtues are can be attained is through teaching. Virtues acquired in this way concern the mind. As such, a person with such intellectual virtues will articulate well and will at all time show good judgement. With regard to garbage disposal, people can be taught about the importance of good practices of garbage disposal. For instance, they can be taught that littering, disposing of garbage through burying and burning, throwing garbage along streets or open space is not a mark of a virtuous person. Such disposal practices have been seen to have negative effects on the environment. The Zambian school curriculum is one example of how intellectual virtues can be acquired. In the curriculum, pupils are expected to acquire knowledge about the environment. Since this kind of excellence is fostered by teaching, it is of the essence that this is done well. What is obtaining in the curriculum at present is that environmental issues are taught but this is only done as a topic in a particular subject. For example, in Integrated Sciences, pupils in grades 1-7 are taught about the environment in one unit. Each grade covers 14 units. This is not adequate in equipping pupils with knowledge for life long experience. Another subject in which the environment is taught is Social Studies and this is done only in grade 6. This does not go far enough in fostering intellectual virtues. The down side of such teaching is that pupils may only be learning for purposes of passing exams or tests. Once done with, they forget very quickly. This is contrary to the ideals of intellectual virtues.

The point about intellectual virtues is that they are intended to become habitual frames of mind. They are not acquired by one or two acts but through learning by repetition. Habits naturally predispose one to act in a certain way. Virtuous habits predispose or condition one to behave in a good way. With regard to garbage disposal, environmental virtues predispose people to act virtuously towards the environment in general and with reference to garbage disposal in particular. Hence, a virtuous person would not dispose of garbage in pits, would not burn garbage or dispose of it along the streets or in any undesignated places for that matter.

It should be noted, however, that intellectual virtues are not the same as moral or ethical virtues although they are intended to support one another. Moral or ethical virtues essentially involve the dimensions of right or wrong, good or bad. A person can have the intellectual virtue of knowing about the physical harms that garbage can have on the human and natural environment but this knowledge may not move the person in question to action. There is need for the additional moral dimension of motivation that comes from having acquired an ethical virtue. Environmental ethical virtues involve habitual attitudes towards the environment that include feelings and emotions, and not just ideas. Such awareness involves care, concern, and

respect for the beauty and value of the natural environment. It means taking responsibility for the natural environment in which one lives. The entails having a proactive mind set. It means that one should live a life that befit environmental virtue. For example, one should try at least to remedy a situation that appears to contaminate the environment. In this case, one should abhor and repudiate the practice of improper disposal of garbage.

Since moral virtues are mastered by repetition, those charged with the responsibility of raising awareness of best practices in garbage disposal will do well to ensure that awareness programmes are set up and implemented. This also calls for the participation of people in such programmes. It has been noted in this study that people's participation and involvement in programmes designed to solve the problem of garbage is very minimal. Clearly, participation is not seen as a legitimate way through which participants could interact with the process of coming up with solutions to the problem of garbage in Livingstone. Attitude change can only come if people are involved in programmes designed to resolve problems that directly affect them. When the public are involved in programs designed to solve the garbage problem, they will gain proficiency in performing temperate actions like sustainable garbage disposal. Holding of garden competitions was cited as one of the ways in which awareness could be raised. When done well, this could cultivate a virtuous character worthy of emulating.

Virtuous character is also acquired by living alongside those who embody it. In this sense, virtuous people have a significant influence on others. In the context of garbage disposal, the example of environmentally sensitive people can have a crucially important motivating influence on the behaviour of others. The situation in Livingstone where garbage is disposed of unsustainably is testimony to the fact that the environment is not being treated in an excellent way.

## **CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS**

### **6.0 Introduction**

This study was an evaluation of garbage disposal and its effects on human health and the natural environment in Livingstone district from an ethical perspective. This chapter highlights main conclusions drawn from the study and makes key recommendations resulting from the findings.

### **6.1 Conclusions**

In view of the discussion and ethical evaluation relating to garbage disposal in Livingstone, the following conclusions are drawn. Firstly, the study has established that (a) the waste stream in Livingstone comprises both organic and inorganic waste whose disposal is achieved mostly through the use of receptacles like tins and sacks, refuse pits, burning and illegal dumpsites; (b) the Council bears the responsibility of garbage collection and disposal in Livingstone; (c) the regulatory framework is ineffective; (d) awareness programs on garbage disposal are non-existent; and (e) the residents are not involved in decision making regarding garbage management. Given this, garbage management in Livingstone district does not manifest sound practice. There is need for greater knowledge and awareness of the importance of the three Rs with respect to garbage, namely, reduction, reuse, and recycling. The inability to manage garbage sustainably is attributable to factors that are composite in nature. These include ineptitude on the part of the LA, intransigence on the part of the LA in enforcing laws that have to do with garbage collection and disposal, lack of technical capacity and transport, non-availability of an awareness and education program, and non-involvement of the public in the resolution of garbage management problems. Garbage disposal in Livingstone through the use

of rudimentary methods like burning, burying, and open disposal has negative effects on human health and the natural environment.

Secondly, with reference to the effects on human health, the study has revealed that garbage that is not disposed well has contributed to incidences of diseases like cholera, dysentery, malaria, respiratory tract diseases and intestinal worms. These have negative effect on the health of the human inhabitants of Livingstone. Disease outbreaks, especially cholera, can alter the behaviour of society in circumstances such as no handshaking, hugging, no funeral gathering or burying of loved ones in the event that one dies of the disease. Other negative ramifications associated with disease incidences include issuance of travel advisory notices which result in cancellations of earlier booked trips and unnerving those intending to travel to the tourist capital. Diseases also contribute to loss of working hours which affect productivity and eventually income of the country in terms of gross domestic product.

The conditions mentioned above are perceived or foreseen. However, unsustainable disposal of garbage is known to cause congenital conditions like birth defects, reproductive problems, impaired behaviour and malignancies. The agents that cause alterations in the normal functions of the body accumulate over a lengthy period of time. These warning signs warrant precaution and preparation for the uncertain health effects of indiscriminate disposal of waste.

Thirdly, with reference to effects on the natural environment, findings revealed the following negative impacts: air pollution, water contamination, soil contamination, aesthetic inconveniences, land degradation, blockage of drainages. Improper garbage disposal also negatively affects animal grazing pasture, can cause injury and/or death to animals, and can cause bush fires in game reserves.

Fourth, the ethical evaluation of the findings concluded as follows: the Precautionary Principle highlighted the need for putting in place precautionary measures to prevent harm before it occurs with specific reference to garbage disposal methods in Livingstone like burning and burying of waste; the holistic approach of the Land Ethic emphasised how the overall ecosystem of Livingstone district is degraded by improper garbage disposal; finally, by applying Environmental Virtue Ethics, it emerged that there is a gross lack of virtuous character dispositions (i.e. wonder, sensitivity, respectfulness, appreciation and gratitude) among Livingstone residents with respect to the wellbeing of the environment. The application of these diverse theoretical approaches all point towards the hazardous nature of improper garbage disposal for both humans and the natural environment.

Lastly, even if the impediments to sound garbage management mentioned above were not present, there would still be no guarantee that the streets of Livingstone would be garbage free. This has to do with the fact that proper disposal of garbage is largely a function of ethical values that govern the conduct of individuals, policy formulators and implementers alike. Hence, garbage management activities that (i) fail to acknowledge the importance of the precautionary principle, that (ii) fail to recognize the holistic dimension of the Livingstone ecosystem with respect to its integrity, stability and beauty, and (iii) that underestimate the importance of inculcating in the people of Livingstone environmental virtue habits, are not going to succeed in improving the current hazardous situation of irresponsible disposal of garbage in the district.

The implications of this study for further research are important for there is still some blurring or fogginess in certain areas. First, it is evident that people are more concerned with diseases due to infection than congenital or non-communicable diseases with regard to improper disposal of garbage. Given this, it is of the essence to delve further into the effects of organic or non-compostable garbage on human health. It is important, for instance, to delve further into the workings of private companies contracted to collect and dispose of garbage. As such, more needs to be done to come up with means and ways of how best to move forward in improving their efficiency and effectiveness. In addition to the foregoing, it would be important if the study is conducted using quantitative methods. This used qualitative methods.

## **6.2 Recommendations**

Given the unsustainability of garbage disposal in Livingstone district and the effects these may be having on human health and the natural environment, the following recommendations are made:

1. LCC should implement policies and enforce all the laws governing garbage disposal, especially those concerned with collection, transportation and disposing of garbage for, at present, there exists impunity.
2. Garbage disposal receptacles such as bins and skips should be provided by the LA and these should be placed in strategic places, especially those where people communally dispose of garbage like markets and other places in the various communities.

3. The public should be involved in all environmental decisions made to solve this problem.
4. Government should introduce a subject on the environment in both primary and secondary schools which should be examinable.
5. LCC, schools, churches and other stakeholder groups should be conducting awareness campaigns designed to promote best practices in garbage disposal such as separation of garbage, composting, waste minimization and community policing against illegal garbage disposal. This may include door to door awareness and motivation programmes, celebration of major occasions, holding of rallies, street plays, clean up drives, and open forums.
6. The LCC should engage more companies to help in the collection and disposal of garbage and private companies should be regulated, monitored and supervised by LCC in their operations.
7. It is suggested that all stakeholders involved in garbage management be enlightened in value judgement to better cope with the complexity of the dilemmas they encounter in garbage disposal and its effects on human health and the natural environment.

## REFERENCES

- Acurio, G., Rossin, A., Teixeira, P. F., & Zepeda, F. (1998). *Diagnosis of Municipal Solid Waste Management in Latin America and the Caribbean*. Washington, DC: PAHO/WHO.
- Attfield, R. (2003). *Environmental Ethics*. Cambridge: Polity.
- Beauchamp, T. L., Walters, L., Kahn, J. P., & Mastroianni, A. C. (2008). *Contemporary Issues in Bioethics*. Belmont, CA: Wadsworth-Thomson Learning.
- Bless, C., & Achola, P. (1988). *Fundamentals of Social Science Research Methods*. Lusaka: Government Printer.
- Colledge, N. R., Walker, B. R., Ralston, S. H., & Penman, I. D. (2014). *Davidson's Principles and Practices of Medicine*. Edinburgh: Churchill Livingstone.
- COMESAT. (2005). *The Precautionary Principle*. Paris: UNESCO.
- Cooney, R. (2004). *The Precautionary Principle in Biodiversity Conservation and Natural Resource Management: An issues paper for policy-makers, researchers and practitioners*. Gland: IUCN.
- Cox, R. (2010). *Environmental Communication and the Public Sphere*. London: SAGE Publications Ltd.
- Cunningham, W. P., & Cunningham, M. A. (2004). *Principles of Environmental Science*. New York: Mc Graw-Hill.
- Curry, P. (2006). *Ecological Ethics*. Cambridge: Polity Press.
- Dietz, T., & Stern, P. C. (2008). *Public Participation in Environmental Assessment and Decision Making*. National Research Council. Washington DC: National Accademies Press.
- Earth Charter Commission,(2012). *The Earth Charter*. Retrieved July 1, 2015, from The Earth Charter Initiative: [http://www.earthcharterinaction.org/content/pages/Read the charter.html](http://www.earthcharterinaction.org/content/pages/Read_the_charter.html)
- ECZ. (2004). *National Solid Waste Management Strategy for Zambia*. Lusaka: GRZ.
- ECZ. (2008). *Zambia Environmental Outlook Repeort 3 - A Report by Environmental Council of Zambia*. Lusaka: GRZ.
- ECZ. (2008). *Annual Report 2008*. Lusaka: GRZ.
- Elliot, R. (1996). *Environmental Ethics*. Oxford: Oxford University Press.

- Gardiner, S. M. (2006). A Core Precautionary Principle. *The Journal of Political Philosophy*, 33-60.
- Glaser, B. G & Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine Publishing Company.
- Goudie, A., & Villes, H. (1997). *The Earth Transformed: An Introduction to Human Impacts on the Environment*. Malden, MA: Blackwell Publishers.
- GRZ. (2011a). *Zambia 2010 Census of Population and Housing: Preliminary Population Figures*. Lusaka: Central Statistical Office.
- GRZ. (2011b). *Environmental Management Act No. 12 of 2011*. Lusaka: GRZ.
- GRZ. (2013a). Government Gazette. *Livingstone City Council*. Lusaka: GRZ.
- GRZ. (2013b). *Integrated Science Syllabus*. Lusaka: Curriculum Development Centre.
- GRZ. (2013c). *Social Studies Syllabus Grade 1-7*. Lusaka: Curriculum Development Centre.
- Hoornweg, D. (1999). *What a Waste: Solid Waste Management in Asia*. Washington, D.C.: The World Bank.
- Hoornweg, D., & Bhada-Tata, P. (2012). *What a Waste: A Global Review of Solid Waste Management*. Washington DC: World Bank.
- Hoornweg, D., Bada-Tata, P., & Kennedy, C. (2013). Environment: Waste Production Must Peak this Century. *Nature: International Weekly Journal of Science*.
- Karanja, A. K. (2005). *Solid Waste Management in Nairobi: Actors, Institutional Arrangements and Contribution to Sustainable Development*. PhD Dissertation, Institute of Social Studies, The Hague, Netherlands.
- Kombo, D & Tromp, D. (2006). Research Design and Methodology. *In proposal and Thesis Writing: An Introduction*. Nairobi: Paulines Publications Africa.
- Lusaka Times. (2012, November 20). *Livingstone City Council Engages 9 Companies to Collect waste*. Retrieved January 17, 2015, from lusakatimes: <http://www.lusakatimes.com>
- MacKinnon, B. (2012). *Ethics: Theory and Contemporary Issues*. New York: Wadsworth, Cengage Learning.
- Mahadevia, D., Amity, M., & Pharate, B. (2005). *New Practices of Waste Management-Case of Mumbai*. Mumbai: CEPT University.

- Martuzzi, M., & Tickner, J. A. (2004). *The Precautionary Principle: Protecting Public Health, the Environment and the Future of our Children*. Copenhagen: WHO.
- Masocha, M. (2004). *Solid Waste Disposal in Victoria Falls Town: Spatial Dynamics, Environmental Impacts, Health Threats and Socio-Economic Benefits*. Unpublished MA. Thesis, University of Zimbabwe, Harare.
- May, S. (2013). *Case studies in Organisational Communication: Ethical Perspectives and Practices*. Newbury Park, CA: SAGE Publishing
- Mbulu, E. (2015, March 26). Councils not Complying with Environment Act. Lusaka: POST Newspaper.
- Mengo, V. (2015, March). Disposable Diapers Hazardous: Contain plastic, super absorbance gel which take long to decompose. Lusaka: Zambia Daily Mail.
- Mohanty, C. R. (2011). *Reduce, Reuse and Recycle (the 3Rs) and Resource Efficiency as the basis for Sustainable Waste Management*. New York: UNCRD.
- Mulenga, C. (2014, October 5). Keep Livingstone Clean Campaign Enters Wards. Retrieved January 25, 2015, <http://www.dailymail.co.zm>
- Mulenga, C. (2015, May 24). 81 year old jailed for illegal waste disposal. Luaska: Zambia Daily Mail.
- Munthali, J. B. (2006). *Community Based Solid Waste Management Strategies for Kamanga Compound*. Unpublished MA. Thesis, Univeristy of Zambia, Lusaka.
- Myers, N. & Raffensperger, C. (2006). *Precautionary Tools for Reshaping Environmental Policy*. Cambridge, MA: MIT Press.
- Nkansu, G. (1999). *Integrated Solid Waste Management – A Zambian Perspective. A Regional Conference on Integrated Waste Management*. Cape Town. South Africa, October, 25.
- OAG. (2010). Value for Money Audit Report on Solid Waste Management in Kampala . Kampala: Office of the Auditor General.
- OECD. (2007). *Guidance Manual on Environmentally Sound Management of Waste*. Paris: OECD.
- Olen, J., & Barry, V. (2002). *Environmental Ethics. In Applying Ethics*. Belmont, CA: Wadsworth.
- O'Murchu, D. (2003). *Quantum Theology: Spiritual Implications of the New Physics*. New York: A Crossroads Book.

- Palczynski, R. (2002). *Study on Solid Waste Management Options for Africa*. Abidjan: ADB.
- Palmer, C. (1997). *Contemporary Issues in Environmental Ethics*. California: ABC-CLIO.
- Pasi, M. M. (2012). *The Impact of Reducing Central Government Grants on Solid Waste Management: The Case of Kabwe Municipal Council*. Unpublished MA. Thesis, University of Zambia, Lusaka.
- Pojman, L. P. (2002). *Ethics: Discovering Right and Wrong*. Belmont, CA: Wadsworth.
- Reid, D. (1995). *Sustainable Development*. London: Earthscan Publications Ltd.
- Robson, C. (2007). *How to do a Research Project: A Guide For Undergraduate Students*. Malden, MA: Blackwell, Publishing.
- Sandler, R. (2010). Environmental Virtue Ethics. In D. R. Keller (ed), *Environmental Ethics: The Big Questions*. Oxford: Wiley-Blackwell.
- Seeliger, L., & Hattingh, J. (2004). *An Opinion Survey of Ethical Concerns in Environmental Decision Making in Cape Town and the Surrounds: The Baseline of 2002*. Stellenbosch: University of Stellenbosch.
- Sichaaza, H. M. (2009). An Assessment of Knowledge, Attitudes and Practices Towards Waste Management Among N'gombe Residents. Unpublished MA. Thesis, University of Zambia, Lusaka.
- Smith, C. (2000). The Precautionary Principle and Environmental Policy: Science, Uncertainty, and Sustainability. *International Journal of Occupational and Environmental Health*, 263-330.
- Strange, K. (2002). Overview of Waste Management Options: Their Efficacy and Acceptability. In R. E. Hester & R. M. Harrison (eds), *Environmental and Health Impacts of Solid Waste Management Activities: Issues in Environmental Science and Technology*. Cambridge: The Royal Society of Chemistry.
- UNDP. (2008). *Livingstone District State of the Environment Outlook Report*. Lusaka: UNDP.
- UN-HABITAT. (2009). *Zambia: Livingstone City Profile*. Nairobi: UN-HABITAT.
- USAID. (2014). *SOLID WASTE: Generation, Handling, Treatment and Disposal*. Waltham: The Cadmus Group.
- Wenz, P. S. (2001). *Environmental Ethics Today*. Oxford: Oxford University Press.

Zhu, D., Asnani, P., Zurbrügg, C., Anapolsky, S., & Mani, S. (2008). *Improving Municipal solid Waste Management in India: A Sourcebook for Policy Makers and Practitioners*. Washington: The World Bank.

## APPENDICES

### Appendix I: Interview Guide for Household Heads

AN ETHICAL PERSPECTIVE ON GARBAGE DISPOSAL AND ITS EFFECTS ON  
HUMAN HEALTH AND THE NATURAL ENVIRONMENT: A CASE STUDY OF  
LIVINGSTONE CITY

Name of Interviewee: .....
Sex: .....
Locality: .....
Date of Interview: .....

#### Questions:

1. What is your understanding of garbage?
2. Who is responsible for managing garbage that is generated in Livingstone?
3. Are you satisfied with the service provided in garbage management?
4. What kind of garbage do you dispose of?
5. How do you dispose of the garbage that you generate?
6. Do you think improper disposal of garbage has effects on
  - (a) human health and
  - (b) (b) the natural environment?
7. If your answer to question 6 (a) is yes, what are the effects on
  - (a) Human health and
  - (b) The natural environment?
8. If your answer to question 6 (b) is yes, what are the effects on
  - (a) Human health and
  - (b) The natural environment?
9. What do you understand about garbage
  - (a) reduction
  - (b) reuse and
  - (c) recycling?
10. How can one
  - (a) reduce,
  - (b) reuse and
  - (c) recycle garbage?
11. Are there ways in which awareness on garbage disposal is conducted?
12. Are there ways in which education on garbage disposal is conducted in Livingstone?
13. Are the ways mentioned in question 10 and 11 effective in combating the practice of improper garbage disposal?
14. How involved are you in decision making in issues of garbage disposal in Livingstone district?
15. Do you take precautionary measures in the issue of garbage disposal?
16. Does improper disposal of garbage affect the
  - (a) beauty,
  - (b) stability and
  - (c) integrity of the environment?

17. What character dispositions are necessary to combat improper disposal of garbage?
18. Is developing habits important in curbing improper disposal of garbage? In children?

**Thank you for your time and the Information**

## Appendix II: Interview Guide for Zambia Environmental Management Agency

### AN ETHICAL PERSPECTIVE ON GARBAGE DISPOSAL AND ITS EFFECTS ON HUMAN HEALTH AND THE NATURAL ENVIRONMENT: A CASE STUDY OF LIVINGSTONE CITY

Name of Interviewee: .....
Sex: .....
Department: .....
Date of Interview: .....
Start Time: .....
End Time: .....

#### Questions:

1. What is your current position in the department?
2. What is the role of your organisation in the management of garbage?
3. How serious or extensive is the practice of improper disposal of garbage in Livingstone city?
4. What do you consider to be the causes of improper disposal of garbage in Livingstone city?
5. What are the consequences of improper disposal of garbage on
  - a) human health and
  - b) the natural environment?
6. How is garbage that is generated in Livingstone city disposed of?
7. How feasible is garbage
  - (a) reduction,
  - (b) reuse, and
  - (b) recycling in Livingstone city?
8. What measures are you using in raising awareness of and education on improper disposal of garbage in Livingstone city?
9. To what extent can you say the measures mentioned in question 7 are effective in combating the practice of improper disposal of garbage?
10. To what extent are the residents of Livingstone city involved in decision making in issues of garbage disposal?
11. What precautionary measures do you emphasise in the issue of garbage disposal?
12. How does improper disposal of garbage affect the
  - (a) beauty,
  - (b) integrity, and
  - (c) stability of the environment?
13. What character dispositions are necessary if indiscriminate dumping of garbage is to be curbed?

**Thank you for your time and the Information**

**Appendix III: Interview Guide for Zambia Wildlife Authority**

AN ETHICAL PERSPECTIVE ON GARBAGE DISPOSAL AND ITS EFFECTS ON  
HUMAN HEALTH AND THE NATURAL ENVIRONMENT: A CASE STUDY OF  
LIVINGSTONE CITY

Name of Interviewee: .....
Sex: .....
Department: .....
Date of Interview: .....
Start Time: .....
End Time: .....

Questions:

- 1 What is your current position in the department?
- 2 How would you describe the quality of garbage management service in Livingstone city?
- 3 What do you consider to be the causes of improper disposal of garbage in Livingstone city?
- 4 What are the consequences of improper disposal of garbage on the natural environment?
- 5 What measures are you using in raising awareness of and education on improper disposal of garbage in Livingstone city to remedy the effects identified in question 3 above?
- 6 To what extent can you say the measures mentioned in question 7 are effective in combating the practice of improper disposal of garbage?
- 7 What precautionary measures do you employ in the issue of garbage disposal?
- 8 How does improper disposal of garbage affect the
  - (a) beauty,
  - (b) integrity, and
  - (c) stability of the environment?
- 9 What character dispositions are necessary if indiscriminate dumping of garbage is to be curbed?

**Thank you for your time and the Information**

**Appendix IV: Interview Guide for District Education Board Secretary**

AN ETHICAL PERSPECTIVE ON GARBAGE DISPOSAL AND ITS EFFECTS ON  
HUMAN HEALTH AND THE NATURAL ENVIRONMENT: A CASE STUDY OF  
LIVINGSTONE CITY

Name of Interviewee: .....
Sex: .....
Department: .....
Date of Interview: .....
Start Time: .....
End Time: .....

Questions:

- 1 What is your current position in the department?
- 2 What is the role of your organisation in the management of garbage?
- 3 What do you consider to be the causes of improper disposal of garbage in Livingstone?
- 4 What are the consequences of improper disposal of garbage on
  - a) human health and
  - b) the natural environment?
- 5 What measures are you using in raising awareness of and education on improper disposal of garbage in Livingstone?
- 6 To what extent can you say the measures mentioned in question 7 are effective in combating the practice of improper disposal of garbage?
- 7 What precautionary measures do you employ in the issue of garbage disposal?
- 8 How does improper disposal of garbage affect the
  - (a) beauty,
  - (b) integrity, and
  - (c) stability of the environment?
- 9 What character dispositions are necessary if indiscriminate dumping of garbage is to be

**Thank you for your time and the Information**

## Appendix V: Interview Guide for Livingstone City Council

### AN ETHICAL PERSPECTIVE ON GARBAGE DISPOSAL AND ITS EFFECTS ON HUMAN HEALTH AND THE NATURAL ENVIRONMENT: A CASE STUDY OF LIVINGSTONE CITY

Name of Interviewee: .....
Sex: .....
Department: .....
Date of Interview: .....
Start Time: .....
End Time: .....

#### Questions:

- 1 What is your current position in the department?
- 2 What is the role of your organisation in the management of garbage?
- 3 How serious or extensive is the practice of improper disposal of garbage in Livingstone city?
- 4 What do you consider to be the causes of improper disposal of garbage in Livingstone city?
- 5 What are the consequences of improper disposal of garbage on
  - a) human health and
  - b) the natural environment?
- 6 How is garbage that is generated in Livingstone city disposed of?
- 7 How feasible is garbage
  - (a) reduction,
  - (b) reuse, and
  - (b) recycling in Livingstone?
- 8 What measures are you using in raising awareness of and education on improper disposal of garbage in Livingstone city?
- 9 To what extent can you say the measures mentioned in question 7 are effective in combating the practice of improper disposal of garbage?
- 10 To what extent are the residents of Livingstone city involved in decision making in issues of garbage disposal?
- 11 What precautionary measures do you employ in the issue of garbage disposal?
- 12 How does improper disposal of garbage affect the
  - (a) beauty,
  - (b) integrity, and
  - (c) stability of the environment?
- 13 What character dispositions are necessary if indiscriminate dumping of garbage is to be curbed?

**Thank you for your time and the Information**

**Appendix VI: Interview Guide for District Medical Office**

**AN ETHICAL PERSPECTIVE ON GARBAGE DISPOSAL AND ITS EFFECTS ON HUMAN HEALTH AND THE NATURAL ENVIRONMENT: A CASE STUDY OF LIVINGSTONE CITY**

Name of Interviewee: .....
Sex: .....
Department: .....
Date of Interview: .....
Start Time: .....
End Time: .....

**Questions:**

- 1 What is your current position in the department?
- 2 What is the role of your organisation in the management of garbage?
- 3 How serious or extensive is the practice of improper disposal of garbage in Livingstone city?
- 4 What do you consider to be the causes of improper disposal of garbage in Livingstone city?
- 5 What are the consequences of improper disposal of garbage on
  - a) human health and
  - b) the natural environment?
- 6 How is garbage that is generated in Livingstone city disposed of?
- 7 What measures are you using in raising awareness of and education on improper disposal of garbage in Livingstone?
- 8 To what extent can you say the measures mentioned in question 7 are effective in combating the practice of improper disposal of garbage?
- 9 To what extent are the residents of Livingstone city involved in decision making in issues of garbage disposal?
- 10 What precautionary measures do you employ in the issue of garbage disposal?
- 11 How does improper disposal of garbage affect the
  - (a) beauty,
  - (b) integrity, and
  - (c) stability of the environment?
- 12 What character dispositions are necessary if indiscriminate dumping of garbage is to be curbed?

**Thank you for your time and the Information**

**Appendix VII: Interview Guide for Focus Group Discussion**

AN ETHICAL PERSPECTIVE ON GARBAGE DISPOSAL AND ITS EFFECTS ON  
HUMAN HEALTH AND THE NATURAL ENVIRONMENT: A CASE STUDY OF  
LIVINGSTONE CITY

Locality: .....
Date of Discussion: .....
Start Time: .....
End Time: .....

Questions:

1. What do you know about garbage?
2. What precautionary measures should one take in the issue of garbage disposal?
3. How does improper disposal of garbage affect the
  - (a) beauty,
  - (b) integrity, and
  - (c) stability of the environment?
4. What character dispositions are necessary if indiscriminate dumping of garbage is to be curbed?

**Thank you for your time and the Information**

## Appendix VIII: Interview Guide for Private Companies

### AN ETHICAL PERSPECTIVE ON GARBAGE DISPOSAL AND ITS EFFECTS ON HUMAN HEALTH AND THE NATURAL ENVIRONMENT: A CASE STUDY OF LIVINGSTONE CITY

Name of Interviewee: .....
Sex: .....
Name of Company: .....
Date of Interview: .....
Start Time: .....
End Time: .....

#### Questions:

1. Which areas do you collect garbage from?
2. What is the role of your company in the management of garbage?
3. How did this company get contracted in garbage collection?
4. Do you charge for the service you offer?
5. If so, how did you arrive at the fees?
6. How much is charged monthly?
7. Are there any payment options?
8. What percentage pay per month?
9. How would you describe the response of the community to paying for garbage collection?
10. What do you do with the households that cannot pay for the service?
11. How often do you collect garbage in the community?
12. How much waste (in kgs) does your company collect per household in a week?
13. What types of garbage do you collect in you designated area?
14. What do you do to the garbage once it has been collected?

**Thank you for your time and the Information**

## **Appendix IX: Observation Guide**

### **AN ETHICAL PERSPECTIVE ON GARBAGE DISPOSAL AND ITS EFFECTS ON HUMAN HEALTH AND THE NATURAL ENVIRONMENT: A CASE STUDY OF LIVINGSTONE CITY**

1. Incidences of littering
2. Methods of garbage disposal
3. Indiscriminate dumping
4. Practices such as recycling
5. Methods of garbage collection