

COMMUNITY BASED SOLID WASTE MANAGEMENT STRATEGIES FOR

KAMANGA COMPOUND IN LUSAKA

BY

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APPROVAL

THIS DISSERTATION BY *JACK BUCHI MUNTHALI* ENTITLED: “COMMUNITY BASED SOLID WASTE MANAGEMENT STRATEGIES FOR KAMANGA COMPOUND IN LUSAKA.” IS APPROVED AS FULFILING THE PARTIAL REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN GEOGRAPHY OF THE UNIVERSITY OF ZAMBIA.

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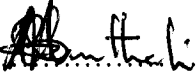
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DECLARATION.

I, Jack Buchi Munthali, declare that this dissertation is a result of my own archival and field research. It has never been presented for a degree at the University of Zambia or any other University. All published works or materials from other sources that have been incorporated have been specifically acknowledged and reference there by given.

Signed... 

Date... 04/07/07

APPROVAL

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IN GEOGRAPHY BY THE UNIVERSITY OF ZAMBIA.

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ABSTRACT

The problems associated with solid waste management are global and require an integrated approach to arrive at a possible long term solution. Lusaka produces more waste than any other city in the country.

This study focused on community based solid waste management strategies in Kamanga Compound of Lusaka. The objectives of the study were to: (i) identify solid waste management strategies; (ii) identify actors involved in solid waste management ;(iii) assess current status; (iv) and effectiveness of the adopted strategies. The study also examined sources of funding and funding mechanisms of the strategies. An examination of the legal and institutional frameworks supporting the adopted strategies was also done to asses their effectiveness in waste management.

Investigations into the problem of solid waste management in Kamanga involved the administering of questionnaires and interview schedules to the residents of Kamanga and key stakeholders respectively. A field survey was also undertaken in Kamanga Compound. The study revealed that there was no uniform strategy for the residents of Kamanga at the household level. Each household adopted a strategy that suited it most. The most common strategy was temporal storage of waste for later collection by the community based enterprise *Samarila Ukhondo*. The waste generated was more of a mixture of organic and inorganic matter.

Actors involved were the residents themselves, *Samarila Ukhondo* a community based enterprise, the Market Business Association, the Lusaka City Council and the Environmental Council of Zambia.

Despite various strategies adopted, waste still accumulated in the compound. The Lusaka City Council failed to remove waste from the communal dumpsites to the final disposal site. However, the Market Business Association effectively removed waste from the market and the surrounding areas. The major sources of funding for the strategies at household level were the residents themselves while at community level it was the government through the Lusaka City Council and donors like the Danish government. At household level, not all residents were able to pay waste collection user fees.

The legal and institutional frameworks in place are adequate to deal with waste management problems. What lacks is the capacity of the Lusaka City Council to enforce the laws.

Therefore, it is concluded that the waste management strategies adopted at household level were effective in removing waste in Kamanga, while at community level, they were not. This is because the Lusaka City Council did not perform its assigned roles. Until all actors perform their roles effectively, the problems of solid waste management in Kamanga Compound will remain unresolved for a long time to come.

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LIST OF ABBREVIATIONS AND ACRONYMS

BOT.....	Build Operate and Transfer.
CBE.....	Community Based Enterprise.
CBO.....	Community Based Organisation.
CSO.....	Central Statistical Office.
ECZ.....	Environmental Council of Zambia.
EPPCA.....	Environmental Protection and Pollution Control Act.
GRZ.....	Government of the Republic of Zambia.
HH.....	Household.
LCC.....	Lusaka City Council.
LTPS.....	Lusaka Town Planning Scheme.
LWMP.....	Lusaka Waste Management Project.
MBA.....	Market Business Association.
MLGH.....	Ministry of Local Government and Housing.
MTENR.....	Ministry of Tourism Environment and Natural Resources.
NGO.....	Non Governmental Organisation
NORAD.....	Norwegian Agency for Development.
NRDC.....	Natural Resources Development College
NSWMSZ.....	National Solid Waste Management Strategy for Zambia
PUSH.....	Peri Urban Self Help.
RDC.....	Residents Development Committee.
SPSS.....	Statistical Package for Social Scientists.
UNDP.....	United Nation Development Program.
UNEP.....	United Nation Environmental Program.
UNESCO.....	United Nation Education Scientific and Cultural Organisation
UNZA.....	University of Zambia.
UTH.....	University Teaching Hospital.
WMC.....	Waste Management Committee.
WMU.....	Waste Management Unit.

OPERATIONAL DEFINITIONS

Effectiveness: Ability of the waste management strategies to produce the intended results, which is removing of waste from households and communal dumpsites in a week.

Peri urban settlements: High-density residential area usually located on the out skirts of the city.

Primary waste collection: Collection of waste from individual households to the communal dumpsite.

Receptacle: A container in which waste is placed or stored before final disposal.

Secondary waste collection: Collection of waste from the communal dumpsite to the final disposal site.

Solid waste: Any waste substance or object that is not fluid, that the owner (user) discards or is obliged to discard.

Strategy: A designed plan for the management of solid waste.

Waste Disposal: The depositing of waste above or underground with the aim of permanent storage

Waste Management District: An area zoned for the purpose of waste management and for which the council may engage a waste manager.

Waste management: Includes solid waste collection, transportation, sorting, recycling, treatment, composting, energy recovery, incineration and disposal.

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CHAPTER ONE: INTRODUCTION

1.1 Background to the problem

Solid waste has emerged as a dominant environmental problem in the world today and most cities in developing countries are grappling with the problem of collection and safe disposal of various types of waste. Although a relatively new issue in environmental protection, solid waste management is receiving the attention it deserves from most political leaders (Matenga and Muyakwa, 1999).

In Zambia, the problem of solid waste management cannot be over emphasized. Today, Zambia is producing more waste than ever before (ECZ/NORAD, 2000). The increase in quantities of waste generated is as a result of industrialization and population growth since the attainment of independence (GRZ, 1994). The increase in population and the growing demand for consumer goods have increased the per capita rate of waste generated in the cities resulting in a serious strain on the environment (ECZ/NORAD, 2000).

In Lusaka, the capital city, the situation regarding solid waste management is worrying. It is estimated that Lusaka produced 1400 tons of domestic solid waste in 1993 (Agyemang et al., 1997), the figure grew to 220,000 tons in 1996 and by 2011, it is projected that over 580,000 tons of waste will be generated in Lusaka, an increase of about 141% (ECZ/NORAD, 2000). More than two thirds of this waste is generated in the peri urban

settlements where 75% of the population is living (ECZ/NORAD, 2000). Waste collection services by the local authority are virtually non-existent due to a lot of constraints faced by the council. This situation has become a source of concern to the public as the uncollected waste is a potential source of diseases such as cholera and other diarrhoeal diseases. The uncollected waste has also caused a general deterioration in the quality of the environment (Mayeya and Mukosa, 1997). The problem of uncollected waste in peri urban settlements has its roots in the historical development of these areas and their subsequent inclusion in the legal urban fabric of the city.

Lusaka, like most other towns in Zambia, is a product of European enterprise and planning (Kay, 1967). From a simple railway siding in 1905, Lusaka has grown to the present day metropolitan. Under the Adhead plan of 1930, Lusaka was designed on the garden city principle with tree-lined avenues and detached houses set on spacious grounds (Agyemang et al., 1997). However, this plan did not mark out housing areas for the Africans. Africans were allowed to build temporal structures within their employers' premises. These compounds are the nuclei around which most of today's peri urban settlements have developed (Schlyter and Schlyter, 1979).

In 1952, the Grandiose Lusaka Town Planning Scheme (LTPS) replaced the Adhead plan. The new plan included areas allocated for African housing (Agyemang et al., 1997). However, the plan only catered for one third of the African population. This meant that squatter settlements continued to grow (Hawkesworth, 1974). The situation got worse after the attainment of independence when travel restrictions were removed. This saw the

growth of squatter settlements such as Kamanga, George, old Kanyama, Kalingalinga, Mandevu, Marrapodi, Ng'ombe and Chainda as people moved from rural areas to settle in these areas.

Owing to their illegal conception, most peri urban settlements have no planned roads and this makes collection of waste from these areas difficult as the waste collection vehicles cannot reach the houses in the interior of such settlements (LCC/ECZ, 1997). The other problem is that most residents in these settlements are either not willing to pay user fees or can not afford to pay user fees to sustain waste collection services by the local authority (LCC/ECZ, 1997). This situation has led to the problem of accumulation of waste over period of time in the peri urban settlements. Collection of waste is usually done when there is an impending epidemic in these areas usually prior to or during the rainy season.

1.2 Statement of the problem

More than two thirds of the domestic solid waste generated in Lusaka is generated in the peri urban settlements, where 75% of the population is living (ECZ/NORAD, 2000). The Lusaka City Council has failed to provide adequate services in the area of waste management. It has many constraints one of them being financial ability to provide adequate waste collection services in peri urban areas. Waste collection by the council is irregular and this has caused waste to accumulate in some peri urban areas.

In Kamanga compound, despite having a community based solid waste management strategy, accumulation of waste was evident in the areas around communal dumpsites such as the maiden boxes on the eastern part of the settlement and areas around the market. Waste accumulation was also evident on the southern and western perimeters of the settlement. This clearly showed that there was a problem in the management of waste, and that the strategy failed to adequately remove waste from the compound. The waste posed a danger to human health as it was a potential source of diseases.

1.3 Purpose of the study

1.3.1 Aims

1. Evaluate the community based solid waste management strategies adopted in Kamanga compound regarding their status, implementation, implementing agencies and funding mechanism.
2. Assess the legal and institutional structures supporting community based solid waste management strategies in Kamanga compound.

1.3.2 Study objectives

1. To identify the solid waste management strategies in Kamanga compound.
2. To identify the actors involved in community based solid waste management strategies in Kamanga compound.

3. To assess the current status of the solid waste management strategies in Kamanga compound.
4. To assess the effectiveness of the adopted strategies in Kamanga compound
5. To establish the sources of funding and the funding mechanism of the community based solid waste management strategies in Kamanga compound.
6. To examine the legal and institutional frameworks supporting the adopted community based solid waste management strategies in Kamanga compound.

1.3.3 Thesis of the study

The thesis of the study is to validate and improve on the existing waste management strategies in peri urban areas of Lusaka. This will be done through the evaluation of the community based solid waste management strategies adopted in peri urban areas and through the examination of the legal and institutional frameworks supporting the strategies to determine their strengths and weaknesses.

1.4 Significance of the study

The study emphasised the strengths and weaknesses of community based initiatives such as *Samarila Ukhondo* as options for solid waste management in peri urban areas at household level. This comes in the light of the local authority having no access to individual households in the interior of the settlement to collect waste to the final disposal sites. The study generated and documented information regarding the strengths,

weaknesses and suitability of adopting community based solid waste management strategies in peri urban settlements. The available information is an important input for town planners and policy makers in developing solid waste management strategies specifically for peri urban settlements such as Kamanga compound.

1.5 Organisation of the dissertation

The dissertation is organized into seven chapters. Chapter One is the Introduction, it gives the background information, the statement of the problem, the purpose and significance of the study. Chapter Two is the Literature Review. The chapter reviews relevant literature on solid waste management. Chapter Three is the Description of the Study Area. Chapter Four outlines the methodology used in the study. Chapter Five presents the results as obtained from the field. Chapter Six discusses the findings of the study and Chapter Seven provides the conclusion and recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Functional elements of solid waste management

The problems of solid waste management in today's world are complex. The solution is found in a number of activities undertaken from the point of generation to final disposal.

These activities are summarised into six functional elements (Heeramun, 1993):

- Waste generation;
- On-site handling, storage and processing;
- Collection;
- Transfer and transport;
- Processing and recovery; and
- Disposal.

2.1.1 Solid waste management: A global view

In the early stages of urbanisation, the need for an organised system of domestic solid waste collection and removal was not great. This is because before the 1920's garbage was mostly organic and could easily be disposed of by burning or biodegradation in pits, backyards and small dump sites. In the twentieth century, a higher percentage of garbage consisted of glass, metal and more recently plastics. The amount of paper and plastic packaging has grown and the organic proportion has lessened. However, the collection and removal of garbage has become a gigantic task operated by municipalities or privately owned solid waste disposal companies contracted to do work for the municipalities (Crook, 1983).

Solid waste management is an integral part of the broad urban and environmental management of a city. The design of the municipal solid waste management component is a key determinant of the effectiveness of the waste management, the designer needed to direct more attention to primary as well as secondary collection operations (Barton et al. 1990). Urban authorities worldwide are facing increasing problems of collection and disposal of solid waste. Traditionally, waste management has been a public sector responsibility; the scenario is now changing in many places. Public private partnerships have been viewed to be the central theme in addressing the world's environmental needs (Buntrock, 1996). More rigid environmental standards and increased costs often make private investment a favorable solution available to most governments.

Today a preventive waste management approach focusing on the changing lifestyle and on production and consumption patterns offers the best chance in reversing the current trends.

2.1.2 Solid waste management in the developed world

The existing consumer attitudes and high standard of living in high-income countries have created problems in the disposal of huge quantities of wastes generated by households and businesses (Buntrock, 1996). This is usually accompanied by high costs of disposal (Roberts, 1996).

In Canada, the solutions sought include the use of sanitary landfills, recycling and resource recovery. Provinces have made it mandatory for large communities to dispose

of their solid waste in landfills specially engineered to accommodate solid wastes (Loreto and Price, 1990). Furthermore, all provincial governments appear to be looking at a programme in reduction, re-use, recycling and recovery of wastes. In the United States of America, when opinion shifted to make recycling of solid wastes a priority, a partnership was formed. The public sector with counsel and guidance from non-governmental organisation, developed a policy, set goals and created a regulatory framework. The private sector developed the facilities, established markets and provided services needed to meet those goals. Now over 50% of the American households participate in some type of recycling programme (Buntrock, 1996).

The Build Operate and Transfer (BOT) contracts in Hongkong were designed to bring private investment into the construction of new infrastructure plants. Under the BOT contracts, private sector finances, build and operate new infrastructure, facility or system according to performance standards set by the government. Hongkong has thus issued BOT contracts for the construction and operation of its solid waste transfer facilities that include a transfer station and a fleet of transfer trucks (Bennet, 1998).

The “Altalanos iskola” and “Zola sziv” youth environmental protection organisations in Hungary are typical of thousands of schools that encourage their students to collect paper, tins and other materials for recycling. These are sometimes sold. At “Altalanos iskola” the paper factory produced a large number of exercise books from recycled paper and these were later given to the school (Roberts, 1996). Some countries in the United Kingdom have opted for partnerships to traditional ways of public service delivery. This

is due to their ability to reduce costs of disposal waste services, meet demand or achieve other benefits such as providing a greater choice of services. In the developed world, the emphasis has been on the recovery, reuse, recycling and processing of wastes at reduced costs.

2.1.3 Solid waste management in developing nations

Urbanisation has taken its toll in the last three decades in developing countries. This has resulted in an increase in the number of people living in urban centers. This increase is accompanied by the increase in the number of people living in poverty. The United Nation Environmental Programme estimated that by the end of the century, 2 billion people will have no access to basic sanitation and a further estimated half of this, to solid waste disposal services (UNEP 1992, www.unep.org/document) Accessed April 2004.

Buenos Aires' marked socially segregated urban structures, neighborhoods within the city show quality and efficiency of management services they receive (Bennet, 1998). Privatisation of solid waste collection in the federal capital has been left under direct municipal administration, one third of its territory, the southern part of the city where low income settlements are located and which did not offer appropriate rates of return to cover the operations of the private sector are under municipal administration. Community participation in most cases is considered a cornerstone for successful solid waste management. This could take the form of an integrated solid waste management strategy where several alternatives of solid waste management techniques are used (Greupner, 2000). In such a scenario, members of the society contribute to waste generation and are therefore, part of the solution to the problem of managing the waste (Greupner, 2000).

In the City of Quito, Ecuador, the local authority has taken a different approach that involves the community. The community group, Barrio el Carmen, a low-income neighborhood of about 250 families in southern portion of Quito is an example of partnership between government and the community (Bennet, 1998). With political support from the city council and some promotional assistance from the local religious organisation, this neighborhood is operating an alternative method for solid waste management based on communal effort and micro enterprise initiative.

Households sort their waste that is collected by the micro enterprise. The micro enterprise then sells the recyclables to traders and companies, while most wastes go to local farms for compost. Non-recyclables and the remaining organic matter is collected by the municipality and transported to the city's dumpsites. To promote this initiative, the municipality has doubled the amount of money earned by the micro enterprise through the sale of its recyclables and investing the money in specific local projects selected by the community (Bennet, 1998).

2.1.4 Solid waste management in Zambia

Zambia is a developing country found in Southern Africa. It is increasingly becoming urbanised, with over 50% of its population residing in the urban areas (GRZ, 2003). This increase is accompanied by a corresponding increase in waste generated. This has become a source of concern for Zambians (Simwanda, 1992). Over a million tons of municipal and domestic wastes are generated each year in various urban centers

(Matenga and Muyakwa, 1999). However, in the last two decades waste collection and disposal services have deteriorated to an extent where there are health hazards to inhabitants (Khonje et al. 1992). Solid waste problems rank highly among environmental factors contributing to the ill health of most people living in the high-density informal residential areas (Mayeya and Mukosa, 1997). According to the social action programme, the magnitude of solid waste problem is worse in high-density areas where roads are impassable by solid waste freighters (Nchito, 2003). Most dumpsites are inaccessible and dustbins are too expensive to be obtained by residents in these informal settlements (Mayeya and Mukosa, 1997).

Lusaka, the capital city, with the population of above 2, 000,000 and the annual growth rate of 3.4 cannot sustain the growing population with the available financial and environmental resources (GRZ, 2003). This is more noticeable in the sphere of service provision. These services fail to reach low-income informal residential areas, municipal services that have evidently failed to reach the peri urban areas include solid waste collection. This is seen in the light of a problem of inadequate financial resources on the part of the local authority to provide such services (LCC/ECZ 1999). This problem has been worsened by the existing weak institutional capacity of implementing bodies such as Environmental Council of Zambia (ECZ) that are unable to prosecute illegal dumpers of solid wastes (LCC/ECZ, 1997).

The public sector has been playing the double role of regulating waste management and actually carrying out the work of managing waste itself. The level of services provided

by the public sector has deteriorated and the hardest hits are the peri urban areas. The population in these areas is poor and does not have adequate resources and therefore cannot afford to pay the city council an economic garbage collection user fee (LCC/ECZ, 1997). The need for an effective, yet cost efficient waste disposal strategy in peri urban areas has become a priority for the local authority in Lusaka. The Lusaka City Council (LCC) has installed collection receptacles such as skips in some of the peri urban areas and market places that act as communal dump sites. Households near these receptacles dump their waste in these skips. The idea was to locate the receptacles in areas that were easily accessible to most residents. The introduction of the skips has greatly reduced accumulation of waste in some of the peri urban areas.

In view of the difficulties faced by the LCC to carry out refuse removal, the local communities through various Non-Governmental Organisations (NGOs) and Community Based Organisations (CBOs) have been involved in waste management. NGOs that have been involved in the removal of waste from some peri urban areas include Care International working in George, Kanyama and Chipata compounds. Peri Urban Self Help (PUSH) Zambia working in Chaisa, Chawama, Mtendere, Bauleni, Kalingalinga and Garden compound (LCC/ECZ, 1997).

A Study conducted in Garden compound focused on prospects of community participation in solid waste management. It revealed that the local community was willing to make contributions to solid waste management in the area (Milanzi, 2002). The community through individual households made contributions in form of money ranging

from K1000 to about K5000. The introduction of Resident Development Committee (RDC) helped organise the community. The effort of the RDC was to be supplemented by the LCC. However, it was discovered that the council could not provide vehicles for secondary waste collection from the communal dumpsite. This led to the failure of the program (Milanzi, 2002). A private company could not be engaged because the community due to their low-income levels could not afford to pay economical rates to sustain the service provision (Milanzi, 2002).

The LCC has since developed a new waste management system with the support of the Lusaka Waste Management Project (LWMP). The new waste management system was to be implemented by the WMU of the LCC in partnership with the private sector with funding from the Danish government. In the new system of waste management, private sector companies are awarded contracts to collect waste in a part of the city and are also responsible for the collection of fees. The WMU is responsible for the collection of waste in the central business district and some parts of the district (LCC, 2004 www.wmu-lusaka.gov.zm). Accessed March 2004..

Under the new waste management system for Lusaka, there are two main areas. One concentrates on conventional residential areas and the other on peri urban areas. The system for conventional areas aims at collecting waste from individual households. Private companies have been given contracts to collect waste from these areas. To facilitate their intervention, the city has been divided into 12 waste management districts.

The new solid waste management strategic plan distinguishes the following waste management districts:

A – Barlastone park, Matero, Lilanda.

B - Emmasdale

C - Chudleigh, Kalundu, Olympia, Olympia Extension, Roma.

D - Kamwala commercial area, Central Business District, Thorn Park Villa Elizabeth.

E - Longacres, Northmead, Rhodes park

F - Chamba Valley, Chelston.

G - Avondale, Chainama, NRDC.

H - Handsworth, Ibex hill, Kabulonga, Sunningdale, Helen Kaunda.

I - Arakan, Kabwata, Kamwala, Libala, Madras, Ridgeway, UTH, Chilenje.

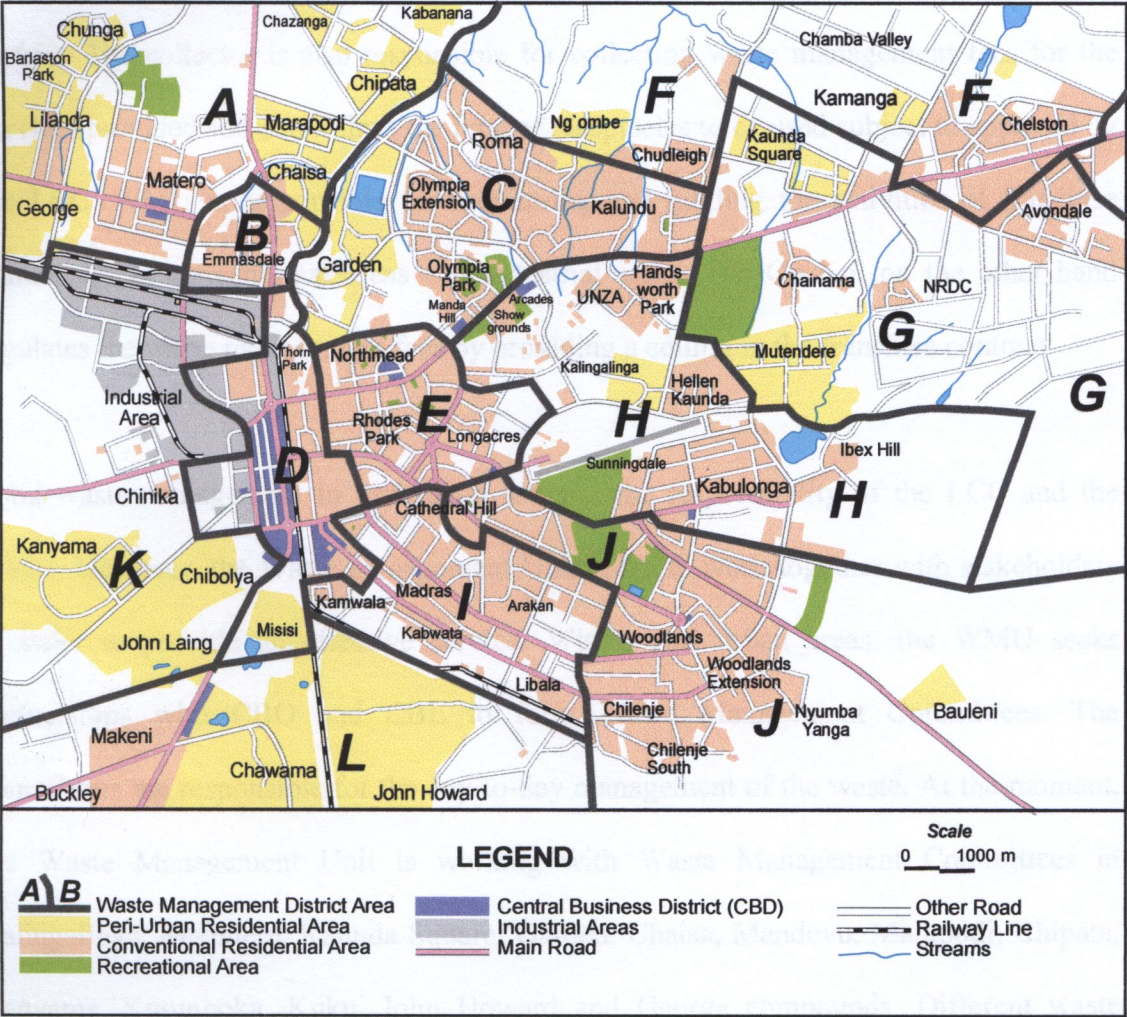
J - Nyumba Yanga, State house, Woodlands, Woodlands extension.

K- Light and Heavy industrial areas.

L - Backley, Lilayi, Makeni ((LCC, 2004 [www.wmu- Lusaka.gov.zm](http://www.wmu-lusaka.gov.zm)). Accessed March 2004.

These are shown in Figure 1. For the areas **C, E, H, I, J, K** and **L** waste management companies have been contracted. The WMU expected that by March 2005 either a waste management company or the WMU would service all waste management districts.

Figure 1: Lusaka Waste Management Districts.



Source: www.wmu-lusaka.gov.zm

In the named districts, (Figure 1) waste collection has been out sourced to private waste management companies through franchise contracts. Each franchise provides the private waste collector with the sole right and obligation to collect and transport waste from the district. The collector is also responsible for collecting waste management fees for the services provided and determines the type of receptacles to be used subject to approval by the LCC. WMU is responsible for monitoring and guiding the activities of franchise contractors in conventional areas and industrial areas. The Council on the other hand regulates the waste management fees by providing a ceiling in the franchise contract

Solid waste management in peri urban areas is the responsibility of the LCC and the WMU. However, the Waste management Unit seeks to work together with stakeholders in order to provide an effective service. Within peri urban areas, the WMU seeks partnerships with CBO and CBE to form Waste Management Committees. The committees are responsible for the day-to-day management of the waste. At the moment, the Waste Management Unit is working with Waste Management Committees in Kalingalinga, Mtendere, Kaunda Square, Garden, Chaisa, Mandevu, Marapodi, Chipata, Kanyama, Kuomboka, Kuku, John Howard and George compounds. Different waste collection systems are applied within the peri urban areas. In most areas, waste is collected through large containers picked up by the WMU to be emptied at final disposal site. In other areas, smaller containers have been placed which when full are emptied at the final disposal site by private waste management companies. In all the systems the households, business entities and institutions are required to bring their waste to the

containers or the WMC organise primary waste collection system ((LCC, 2004 [www.wmu- Lusaka.gov.zm](http://www.wmu-lusaka.gov.zm)). Accessed March 2004. The WMU is responsible for the secondary collection of waste from the container and the subsequent transportation to the final disposal site (LCC, 2004 [www.wmu- Lusaka.gov.zm](http://www.wmu-lusaka.gov.zm)). Accessed March 2004.

The WMU is also responsible for the enforcement of the waste management regulations under the Local Government Act (Cap.281, volume 16 of the laws of Zambia) Statutory Instrument No.91 Of 2004. It is on the basis of the above provisions, that the Lusaka City Council has established the new waste collection service as well as come up with the fees for the services offered (LCC, 2004 [www.wmu- Lusaka.gov.zm](http://www.wmu-lusaka.gov.zm)). Accessed march 2004.

The ECZ established under the Environmental Protection and Pollution Control Act (EPPCA) of the laws of Zambia, provides control of activities related to environmental protection. The Council has developed a National Solid Waste Management Strategy for Zambia (NSWMSZ). This was done in an effort to bring improvements in waste management.

The objectives of the NSWMSZ include : Minimise generation of waste, maximise the collection efficiency of waste, reduce the volume of waste requiring disposal and maximise the economic value of waste and develop and adopt environmentally sound treatment and disposal methods (ECZ, 2004).

The targets of the NSWMSZ include; ECZ collaborating with stakeholders to strengthen awareness on generation and storage of waste. The generators of waste are required to treat and pre-treat waste generated before disposal (ECZ, 2004); establishment and improved co-ordination among stakeholders in waste management in a multi-sectoral and integrated manner; introduction of a system of levies and incentives to minimise the use of non-biodegradable or non-recyclable materials, and promote reuse and recycling of waste. In the same way, government would incorporate levies, penalties and tax rebates in order to encourage industry adopt environmentally friendly technologies (ECZ, 2004) ; Government through respective agencies, based on their mandate, roles and responsibilities participate through policy and legislation formulation that assist in enhancing and improving services of waste collection, treatment and disposal. (ECZ, 2004).

The NSWMSZ was drawn to address all the sectors of the economy that lead to the generation of waste. It aims at providing guidance on waste management for all stakeholders in government, industry and business, private sector, NGOs, learning and research institutions, and the community (ECZ, 2004).

CHAPTER THREE: DESCRIPTION OF THE STUDY AREA

3.1 Physical characteristics

3.1.1 Location

Kamanga compound is located between latitudes 15° 21'S and 15° 22' S and longitudes 28° 22' E and 28° 23' E. It is approximately 15 kilometres from the Central Business District. To the east of the settlement is the D564 road separating it from Chelstone. To the north and the west are smallholder farms. To the south of the settlement is the Great East Road (Figure 2).

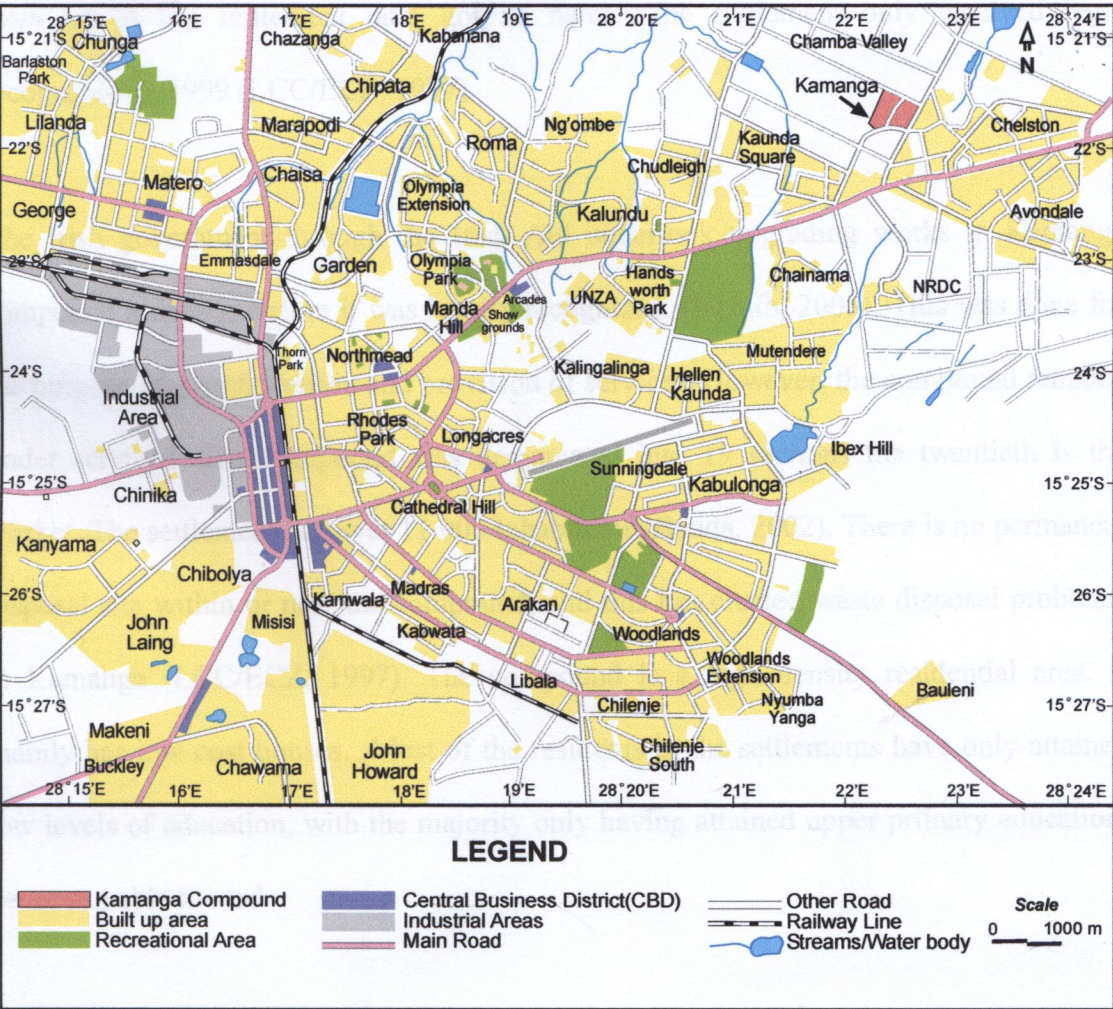
3.1.2 Geology

The geological set up of Kamanga compound comprises a very ancient (Pre-Cambrian) basement complex overlain by the more recent limestone and dolomite. The basement complex consists of granites, gneises and quartzites (Agyemang et al., 1997).

3.1.3 Soils

The soils of Kamanga vary according to the underlying geology. Those developed over the limestone and dolomites are generally varied in texture and depth: from deep red-brown clays to dark loamy soils. Those developed over quartzite and other sandstone formation are light, sandy and well drained (Agyemang et al., 1997).

Figure 2: Location of Kamanga Compound in Lusaka.



Source: Re-drawn from map of Greater Lusaka, 1:50,000 Survey Department 1986.

3. 2 Socio economic aspects

The settlement was originally part of a farm owned by a white expatriate, Mr. Foxdale prior to Independence in 1964. He later went back to his home country and left his property in the care of his manager Mr. Museteka. Mr. Museteka invited his relatives among them was his cousin Mr. Kamanga. Mr. Kamanga was a popular traditional dancer from whom the settlement later got its name. The settlement only received legal recognition in 1999 (LCC/ECZ, 1997).

The Irish government through the Irish Aid undertook upgrading works in Kamanga compound a decade before it was legally recognized. (Nchito, 2003). This was done for the purpose of easy operation and provision of services. However, the compound remains under serviced. The compound was demarcated into 19 sections the twentieth is the market. The settlement has over 11 000 inhabitants (Banda, 2002). There is no permanent disposal site within or near the compound, and this has created waste disposal problems in Kamanga (LCC/ECZ, 1997). The compound is a high density residential area. It mainly has low cost houses. Most of the residents in the settlements have only attained low levels of education, with the majority only having attained upper primary education, hence not able to read.

In Kamanga the average household size is nine members. Each of the household on average generates less than half an empty 25kg bag of mealie meal of an assortment of waste in a week.

CHAPTER FOUR: METHODOLOGY

4.1 Research design

4.1.1 Types and sources of data

The study employed secondary data and primary data. Secondary data were collected through library research and the review of relevant literature on the topic of solid waste management from LCC, ECZ, and University of Zambia and from the internet.

Primary data were collected by the use of questionnaires and interview schedules. The questionnaires were administered to individual households (Appendix I). The researcher filled in some of the questionnaires as some of the respondents could not read or write. Only about thirty four percent (34.2%) of the respondents attained upper primary education. This meant that the majority of the respondents could not confidently fill in the questionnaires.

Interview schedules were administered to relevant stakeholder institutions (Appendix II). These included the CBE *Samarila Ukhondo*, the MBA, the LCC and the ECZ. These are the institutions that were involved in waste management in the area. They represented the institutional framework that supported solid waste management in Kamanga.

Photographs were also taken during the field survey of the area. The survey was carried out in order to collect data on aspects that were difficult to capture by the questionnaires or the interview schedules. This was information such as the location of the dumpsites,

the visual impact of the uncollected wastes and the different type of waste generated by household. The survey was also undertaken to verify the data collected on aspects such as the kind of waste management strategies adopted and receptacles used.

4.1.2 Sampling procedure

It was not possible to use the entire population of Kamanga instead, a sample was drawn. The sampling frame comprised a map showing the houses in the study area. This was prepared by the LCC. This was supplemented by the register of residents in Kamanga compound prepared by LCC and updated by the RDC of Kamanga. The individual household was used as the sampling unit in the study.

Kamanga compound is made up of three areas, the existing Kamanga, overspill one and overspill two (Figure 3). The existing Kamanga had different housing structures compared to overspill one and two. In overspill one and two, the housing units were arranged in order of lines with regular roads. This was not the case for existing Kamanga as there was no defined order of the houses

A sample of 120 households was drawn from a population of approximately 1243 households in the study area. This sample was drawn from the three areas existing Kamanga, overspill one and overspill two. This sample represented about 10% of the population and was large enough to be representative of the population.

The stratified sampling method was used. This was in order to get equal representation of the households within the three areas. A total of 40 households were picked from each of the three areas. This was preferred for comparison purposes

In overspill one and two where housing units were in order of lines, it was easy to use the map prepared by the Council for sampling. The first household was randomly picked there after every tenth house was picked. A total of 80 households were picked from overspill one and two. In existing Kamanga, the register was used to get the 40 remaining households. This was because there was no defined pattern in the arrangement of the housing units. The first household was randomly picked there after every tenth household was picked. These were later followed in the field with the help of the council officer stationed at the RDC office.

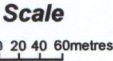
4.1.3 Data analysis.

Data were summarised in form of frequency distribution, Charts and tables. The Pearson product moment correlation was used to determine the relationship between the household size and the amount of waste generated at each household. Data on effective of the waste management strategies was analysed using frequency of collection of waste within a week from the households and from the communal dumpsite.

Figure 3: Sampling Areas in Kamanga Compound



SOURCE: Lusaka City Council



LEGEND

- Permanent Buildings
- Existing Kamanga Compound
- 1 Overspill 1
- 2 Overspill 2
- Gravel Roads
- Maiden Boxes

4.2 Data limitation.

Data collection was problematic in that most of the respondents had very low levels of education. It was difficult in some instances to interpret certain terminologies in to the local languages that they could easily comprehend.

On the other hand, respondents were expectant of some kind of help from the researcher. This could have influenced some of their responses to questions asked. Data collection was done just before the onset of the rain season, a time when the local authority intensified its solid waste collection activities. This was the time when the Council was implementing the Lusaka Solid Waste Management Strategy. This could have affected the data collected.

CHAPTER FIVE: DATA ANALYSIS AND FINDINGS

This chapter presents the data collected from the field and presents the analysis of the data. The data is presented in form of tables and charts. The data is presented in the chronological sequence of waste management from point of generation through the processing stage to the disposal at the communal dumpsite.

5.1 Solid waste management at household level

Various waste management strategies are used as revealed by the results obtained from the households interviewed. The data on the waste management strategies used at household level are summarised in Table 1.

Table 1: Waste management strategies at household level

Waste management strategies	Absolute Frequency	Relative Frequency (%)
Burning	23	19.2
Storing	64	53.3
Burying	12	10
Other	21	17.5
Total	120	100

(Source: Field data).

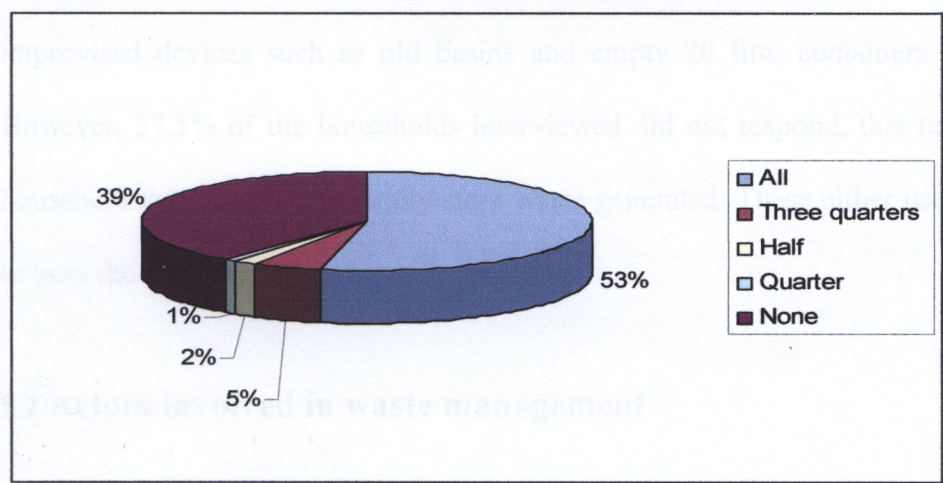
Over fifty percent (50%) of the households stored the waste generated temporarily in receptacles such as plastic bags, sack and other improvised devices before it was removed and taken to the transit points. This was the most widely used strategy. The second most

popular strategy at household level was burning of the waste. The burning was done in the backyards of their houses.

5.1.1 Storage of waste

Data obtained from the field on the quantity of solid waste stored at various households in Kamanga compound are summarised in Figure 4.

Figure 4: Quantity of waste stored at household level



(Source: Field data).

Figure 4 shows that 53% of the households temporally stored all waste they generated while only five percent 5% did not store any of the waste generated.

5.1.2 Receptacles used

Various kinds of receptacles were used in different households to temporally store waste generated. This data are given in Table 2.

Table 2: Receptacles used at household level

Receptacles	Absolute Frequency	Relative Frequency (%)
Plastic bags	2	1.7
Litter bins	16	13.3
Sacks	34	28.3
Other Improvised devices	23	19.2
Not applicable	45	37.5
Total	120	100.0

(Source: field data).

The most used receptacles in the storage of waste were sacks followed by other improvised devices such as old basins and empty 20 litre containers of cooking oil. However, 37.5% of the households interviewed did not respond, this represented those household that did not temporally store waste generated. These either used backyard pits to bury the waste or burnt the waste.

5.2 Actors involved in waste management

The following data were obtained from the field regarding actors involved in solid waste management in Kamanga compound.

5.2.1 Actors involved at household level

The data obtained indicated that 2.5% of the respondents said it was the LCC that collected waste from their households, 52.5% said it was *Samarila Ukhondo* the community based enterprise and 44.2% were non responsive as they did not store away waste hence did not have any organisation collecting waste from their households (Appendix III)

5.2.2 Actors involved at community level

The data obtained from the administration of interview schedules to key organisations reviewed that the LCC and the MBA were involved in the collection of waste from the communal dumpsite to the final disposal site.

5.3 Status of solid waste management in Kamanga

The field survey carried out revealed that there were piles of waste accumulated on the western perimeter of the compound and areas around the maiden boxes (Plates 1 & 2).

The waste remained uncollected for a long period of time during the time of the study.

The amount of waste that was generated at household level varied from one household to the other. The product moment correlation coefficient between the household size and the amount of solid waste generated per household revealed a positive correlation of 0.001 between household size and the amount of waste generated.

5.3.1 Frequency of waste collection from households

The frequency of waste collection from households by the community based enterprise *Samarila Ukhondo* varied from household to household. This mainly referred to the households that used *Samarila Ukhondo* to collect waste from their households. Approximately fifty one percent (50.8%) of these respondents indicated that they had *Samarila Ukhondo* collect waste from their household once to twice per week, 3.3% had *Samarila Ukhondo* collect waste from their household up to four times per week and 1.7% of the households had their waste collected everyday. The finding also revealed that

44.2% of the households stored their waste for over one week before *Samarila Ukhondo* could collect it (Appendix III).

Plate 1. A pile of waste near the maiden box.



Plate 2. A pile of waste on the western perimeter of the compound.



(40%) generated a mixture of organic and inorganic waste.

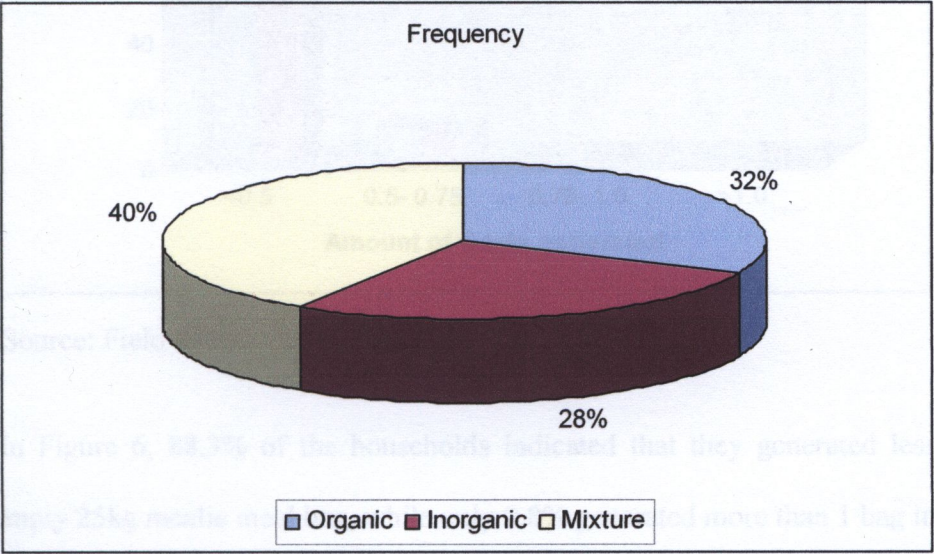
5.3.2 Waste collection user fees

Nearly fifty six percent (55.8 %) of the respondents indicated that they paid to *Samarila Ukhondo* to collect waste from their households to the communal dumpsite. Over forty percent (42.5%) indicated that they did not pay to any organisation to collect waste from their households. However 1.7 % did not respond (Appendix III).

5.3.3 Types of waste generated

Data on the types of waste generated are summarised in Figure 5.

Figure 5: Types of waste generated



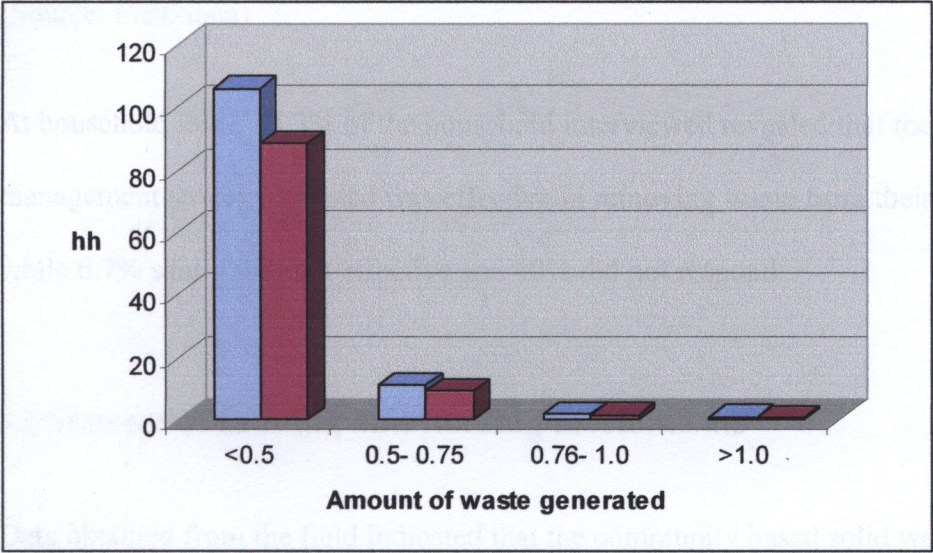
(Source: Field data).

The greater composition of the waste generated by the households was a mixture of organic waste and inorganic waste. Organic waste comprised leaves, food remains and ash. Inorganic waste comprising plastic, paper and construction remains. Forty percent (40%) generated a mixture of organic and inorganic waste.

5.3.4 Amount of waste generated at household level

These data are summarised in Figure 6. The amounts generated are proportional to an empty 25kg bag of mealie meal.

Figure 6: Amount of waste generated/ empty 25kg bag/hh



(Source: Field data).

In Figure 6, 88.3% of the households indicated that they generated less than half an empty 25kg mealie meal bag, while only 0.8% generated more than 1 bag in one week.

5.4. Effectiveness of waste management strategies

The responses on how effective the solid waste collection was in Kamanga are summarised in Table 3.

Table 3: Effectiveness of waste management strategies

Effectiveness	Absolute Frequency	Relative Frequency (%)
Effective	64	53.3
Not Effective	8	6.7
No Response	48	40
Total	120	100

(Source: Field data)

At household level, 53.3% of the household interviewed revealed that the waste management strategy adopted was effective in removing waste from their households, while 6.7% said it was not effective and 40% did not respond.

5.5 Sources of funding and funding mechanisms

Data obtained from the field indicated that the community based solid waste management strategy adopted sourced its finances from individual households user fees paid to *Samarila Ukhondo* for the collection of waste from their households. It was obtained that 5% of the respondents indicated that they paid K500.00, 52.5% said paid between K1000.00 and K2000.00, 0.8% indicated they paid K 5000.00 and above. It was also found that 40.8% of the households did not pay for the service (Appendix III).

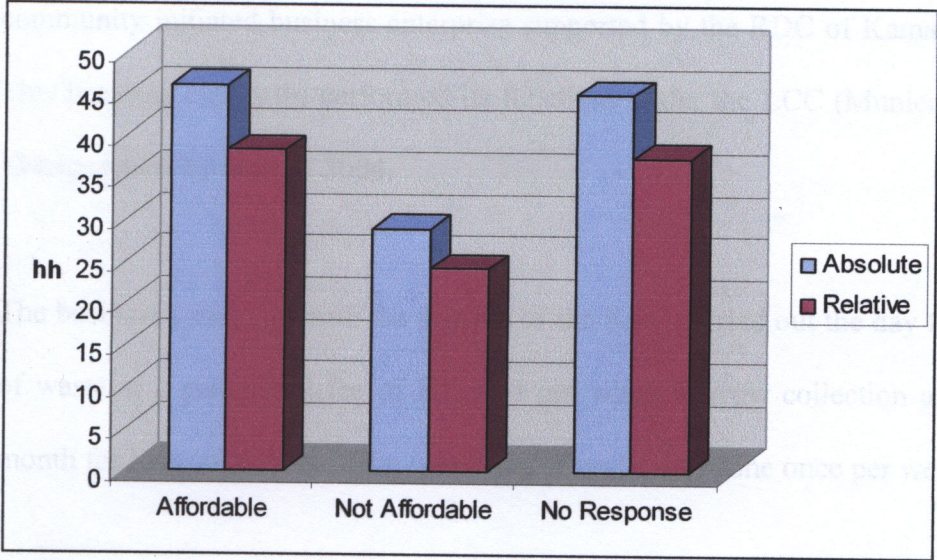
In addition to the self financing mechanism of the community based solid waste management strategies in Kamanga, there are some donor funds that come in through the LCC. The Council was funded by the Danish government through the Waste

Management Unit. There are also Governments grants that come in from the Government to finance the various operations of the Council. These grants are usually not adequate to finance all the operations of the Council.

5.5.1 Affordability of waste collection user fees

The data on the affordability of waste collection user fees on the part of the respondents are summarised in the Figure 7.

Figure 7: Affordability of waste collection user fees



(Source: Field data).

In Figure 7, 38.3% of the respondents indicated that the user fees charged by *Samarila Ukhondo* were affordable. On the other hand 24.2% said the fees were not affordable and 37.5% did not respond.

5.6 Legal and institutional frameworks

Interviews were conducted with key Institutions involved in solid waste management in Kamanga (Appendix II). The first institution visited was the CBE *Samarila Ukhondo*. Others included: the MBA, the LCC and the ECZ.

5.6.1 Community Based Enterprise (*Samarila Ukhondo*)

The enterprise's major role was to collect solid waste from door to door in Kamanga Compound at a fee. The enterprise comprised members of the community who came together with a business suggestion to collect waste from individual households. It is a community initiated business enterprise supported by the RDC of Kamanga Compound. This business enterprise performed its functions under the LCC (Municipal Solid Waste Management) by laws of 2004.

The business enterprise with the support of the RDC carried out the day to day collection of waste at a prescribed fee of K1, 500 per wheel burrow collection and K5, 000 per month for four collections. The collection of waste was done once per week on average.

5.6.2 Market Business Association (MBA)

The other institution visited and an interview schedule administered was MBA. The role of the institution in solid waste management was to ensure that the waste in and around the Market area was collected and disposed of in one area where local authority would collect it.

The association was registered under the Registrar of Societies and had its' own regulatory framework (constitution) that governed its' operations and functions. Waste management was just one of the many operations the association performed. The association did not perform its functions through any established institution. Members themselves executed the function of solid waste management by mobilising labour to collect and dispose the waste. The association was setup by the Market Executive and it gets its funding from market monthly levies of K4, 000 per stall or stand per day or K120, 000.00 per month.

5.6.3 Lusaka City Council (Waste Management Unit)

The local authority the LCC is another institution where interviews were conducted. It was found that like any other municipality one of its major function was the provision of secondary collection of waste from residential and industrial areas within the city to final disposal sites.

The legal framework under which the local authority carries out its functions was the Local Government Act in general and the Lusaka Waste Management by laws in particular (Appendix IV). These in their existing form according to the Council are adequate in dealing with the management of solid waste within peri urban areas Kamanga inclusive.

However, the local authority, the LCC works hand in hand with the community initiated business enterprise *Samarila Ukhondo* which collects waste from door to door. All the

functions of the LCC regarding waste management are governed by the local Government Act.

The existing funding for the operations of the local authority is from the Government and donor organisations such as the Danish government that have supplied a fleet of waste collection vehicles. At household level, the waste generators have to pay for the services they receive. However, the Government is the major financier of the operations of the LCC in form of grants.

5.6.4 Environmental Council of Zambia

The ECZ major role in solid waste management is the regulation of legislation, information dissemination to stakeholders and coordination of solid waste management activities. The Council operates through the EPPCA No. 12 of 1990 (Appendix V). The Act outlines the roles and functions of the Council. In its current form, the Act is adequate in dealing with solid waste management.

The Council is primarily funded by Government. However, donors and other cooperating partners fund specific project areas; solid waste management is one such area. The Council's regulatory function of enforcing the legislation is performed by its inspectorate unit.

CHAPTER SIX: DISCUSSION OF RESULTS

6.1 Waste management strategies

It was found out that various waste management strategies were adopted in Kamanga by different households. Each household had its own strategy depending on the resources at its disposal. These strategies included burning of the waste generated at household level, storing of the waste generated up to such a time it was collected from the household by the business enterprise *Samarila Ukhondo*. The other strategies included burying of waste generated into backyard pits and others such as using the manure or organic waste into backyard gardens and the use of pits. However, over 53.3% of the household temporarily stored the waste generated due to the fact that this was the strategy that suited majority of the households. The majority of the households did not have enough space to dig pits in their backyards or gardens where they could use the organic manure. The waste was temporally stored while waiting for *Samarila Ukhondo* to come and collect it. This was the most feasible mode of managing waste. The study by Milanzi (2002) of Garden Compound of Lusaka brought out similar results. Over forty seven percent (47.5 %) of the households in Garden temporarily stored the waste in various receptacles. The similarity arises from the fact the populations of Kamanga and that of Garden are similar in terms of their social economic status. The similarity also reflects the generally acceptable strategy for waste management at household level in the two populations. This is the trend world over, even in developed nations, it was observed that the majority of the household temporarily stored the solid waste they generated. They used litter bins for temporary storing the waste at household level. However, their focus was on reducing the

amount of the waste they generated.

6.1.1 Waste storage

There were variations in the quantity of waste stored from one household to the other. The variations resulted from the fact that some household combined some waste management strategies. Almost all households practised some kind of storage of waste, however, the length of time the waste was stored differed. The average length of time the waste was stored was one week. This was the period of time it took the business enterprise *Samarila Ukhondo* to go round collecting waste. Some households stored all the waste generated, others only stored three quarters of waste generate. There were other households that only stored half of waste generated and others only stored quarter the waste generated. There were other households that did not store any waste generated. These either burnt the waste or buried it or used it in the backyard garden. Most of the households temporarily stored all the waste that was generated as was evident from the results obtained. The difference in the length of time the waste was stored at different households was mainly influenced by the availability of funds in that house holds. Households could accumulate waste up to such a time they had resources to pay *Samlira Ukhondo* to collect the waste. The type of waste also determined the length of time for storage, waste that was inorganic was stored for longer time unlike the organic type. Those house holds that were located in the periphery of the compound and near maiden boxes disposed of their waste immediately or on daily basis.

6.1.2 Receptacles used

Different types of receptacles were used for the temporal storage of waste by various households depending on what they could afford to use. The receptacles used included plastic bags, litter bins, sacks and other improvised devices such as old buckets, empty 20 litre plastic containers and old metal basins. The most popular receptacle used as obtained from the results was the empty mealie meal sacks. Use of empty sacks was the most common practise by the majority of the households. This was because the empty mealie meal bags were readily available as these were acquired when buying mealie meal which is the staple food for most of the households in Kamanga. A study done by Banda (2002) in Kamanga provide similar finding. This can be attributed to the fact that the characteristics of the population of Kamanga have not changed much over the period between the two studies. Though the study by Milanzi (2002) focused more on the prospects of community participation in waste management, it highlights the fact that the majority of the respondents used sacks for temporal storage of waste in garden compound. There was a relationship between the type of receptacle used and the length of time of storage of the waste at household level. Those that stored the waste in litter bins could store it for longer periods as these could be covered.

6.1.3 Amount of waste generated

The results indicated that the amount of waste generated amounted in the range from less than half an empty 25kg sack to over 1 empty 25 kg sack of mealie meal. Over 88% of the households generated waste less than half an empty 25 kg sack a week. This reflected the average quantity of waste a household generated in Kamanga. The results revealed

that 9.2% of the households generated between half and three quarters of an empty 25kg bag, 1.7% generated over 0.76 and less than one whole bag. These are those households that were involved in some kind of trade such as the sale of opaque beer packaged in hard paper containers. Only 0.8% generated over one bag of waste. This was where there were carpentry works done in the backyard. The results of the Pearson product moment correlation indicated that there was a weak positive correlation ($r = 0.001$) between the amount of waste generated and the household size. With the $r = 0.001$, and the critical value being 0.195 at the 0.05 significance level with 100 degrees of freedom, it can be concluded that there was no significant relationship between the amount of waste generated and the size of the household in Kamanga. However, it was difficult to determine the exact quantity of waste generated because some of the organic wastes like foodstuff remains were disposed off quickly.

6.1.4 Types of waste

The type of waste generated was categorised in three, organic, inorganic and a mixture of organic and inorganic wastes. Organic waste mainly comprised vegetative matter and food remains. This included fruit skins, vegetable peelings, bones from various foods, and leaves. These easily decompose and give off unpleasant odours, mainly in the rainy season when left exposed to the rain. This type of waste was removed from households very quickly. Inorganic waste mainly comprised plastics, paper, and glass and construction debris. These also included bottles, plastic of various kinds, old cloths or rags, soil sweepings and paper. This type of waste could be kept for slightly longer periods. The organic waste posed a danger as it was the potential source of diseases such

as diarrhoea. The waste from the market was mostly organic in nature mostly comprising rotten vegetables and fruits .Most households (40.8%) on the other hand generated a mixture of organic and inorganic waste. This was an indication that there was no sorting of waste at household level. This in itself provides a challenge to improving the management of waste. Unless the waste is sorted out at source it becomes difficult to implement other strategies such as reuse and recycling. The study earlier done by Banda (2002) shows that other waste (paper and plastics) were the dominant waste. The difference arises from the different ways the waste was categorised in the two studies. While Banda (2002) used more specific categories, this study categorised them generally.

6.2 Actors involved in waste management

The results presented indicated that at household level the actors included the generators in this case the residents and the community based enterprise, *Samarila Ukhondo*. The individual household adopted various strategies of managing the waste they generated. The community based enterprise *Samarila Ukhondo* was the organisation responsible for collection of waste from households to the communal dumpsite.

At community level, actors involved included the MBA, which was responsible for managing of waste in and around the market area. The Association removed waste from the market area to the communal dumpsite. The other actor was the LCC, the local authority whose role was to collect waste from the communal dumpsite to the final disposal site. It was at this stage in the process of waste management where the problem

was. The LCC did not regularly collect waste from the communal dumpsite to the final disposal site. This allowed waste to accumulate in the communal dumpsites for long periods of time. The role of the ECZ was to regulate the activities of the LCC. It failed to compel the LCC to collect waste as prescribed in the Act.

According to the findings, not all the actors performed their roles to the expected standards. Starting with the residents themselves, not all paid to *Samarila Ukhondo* to collect waste from their households. These residents either dumped the waste along roads or directly in and around the maiden boxes. The community based enterprise *Samarila Ukhondo* was doing the best it could, however, it was restricted in its operations in that it could only collect waste from those households that paid the user fees. This was regardless of the fact that all households generated waste and that the waste needed to be managed in one way. The MBA effectively carried out its function of removing waste from the market and the areas around the market. The only problem was that the MBA only restricted its operation to the market and areas surrounding the market. There was no actor responsible for clearing waste dumped along roads and in undesignated areas such as open spaces.

6.3 Status of waste management

The field survey carried out in Kamanga showed that there were piles of waste on the western perimeter of the compound and around the maiden boxes and along certain foot paths and roads within the settlement. It was evident that the removal of waste by the

LCC from the maiden boxes took time. On the other hand, there was no actor responsible for clearing waste that accumulated along foot paths and roads within the settlement. This waste was not collected for a long period during the time the study was conducted. From the findings it is clear that there was gap in waste management strategies adopted in Kamanga as there was no defined actor at the community level charged with the responsibility to collect waste that accumulated along road and undesignated areas. The responsibility of the Council ended at collection from the maiden boxes. Similar results have been obtained elsewhere in Lusaka (Milanzi, 2002; Banda, 2002).

6.3.1 Waste collection from households

The study revealed that 55.8% of the respondents paid to *Samarila Ukhondo* to collect waste from their households. This indicated that the majority of the households paid to the community based enterprise, *Samarila Ukhondo* to collect waste from their households. More than half of the respondents used the *Samarila Ukhondo*. About 42.5% did not use *Samarila Ukhondo*. They either burnt all the waste they generated or illegally dumped waste along foot paths within the compound. This was hazardous to the community especially in the rainy season the time when cholera easily spreads in dirty environments.

On average the majority of the household could afford to pay for one collection per week. However, the frequency of collection of waste from each household depended on financial capability of the household. Some households could store waste until such a time they could afford to pay to *Samarila Ukhondo* for collection. The households are not

compelled by any law to pay for the services.

6.3.2 Affordability to pay waste collection fees

The amount paid for the collection of waste from households depended on the amount of waste generated and the mode of payment preferred by the household. The amount charged per wheel burrow of waste collected by *Samarila Ukhondo* was K1, 500.00. However, if the individual house hold preferred to pay on a monthly basis, they paid K5, 000.00 for four collections, once a week.

From the results presented, various figures for waste collection fees were given by different respondents, this revealed the fact that though the prescribed fee charged by *Samarila Ukhondo* was K 1,500.00 per wheel burrow, some respondents negotiated and paid less than the prescribed fee. This was the case despite the fact that the majority of the households interviewed indicated that the user fees charged by *Samarila Ukhondo* were affordable. This was a weakness in the waste management system at household level. There was need for the community based organisation to compel every one pay a uniform fee for the services offered. The fact that 24.2% of the responses indicated that the fees charged were not affordable was another problem for solid waste management. These respondents either used other waste management strategies such as burning or dumped waste along footpaths and other roads as these were cheaper alternatives which were not environmentally sound. 37.5% did not respond, these respondents most likely expected free services from the community based enterprise *SamarilaUkhondo*. Under the circumstances this was not possible. This is in direct contrast to the situation in the

developed world where citizens oblige to pay user fees. This is attributed to the differences in consumer behaviours and income levels of the citizens. In high income nations where huge sums of money directed toward waste management, issues of non affordability do not arise.

6.4 Effectiveness of strategies

Over 50% of the households interviewed said the system was effective in removing waste from their household. These households used one or a combination of waste management strategies. They burnt their waste, buried it or stored it temporarily for further collection by the community based enterprise, *Samarila Ukhondo*. This indicated that the waste management strategies adopted at individual household level were effective in removing waste from households. The respondents were responsible for cleaning their immediate surroundings.

However, piles of waste accumulated on the western perimeter of the compound and along some roads highlight the weakness of the waste management system at community level. The waste management system in place did not prescribe which actor was responsible for the collection of waste that was dumped along footpaths and roads within the settlement. As a result, this waste remained uncollected. The local authority, however, did not collect the waste that accumulated in the maiden boxes and areas around the boxes in good time hence the accumulation of the waste. This was due to lack of transport on the part of the LCC. This on the other hand discouraged households to pay

to the community based enterprise *Samarila Ukhondo*. In the long run, this created a problem for the community based enterprise in collection of funds and disposal of waste.

6.5 Legal and institutional frameworks

The results from the study indicated that there were two main institutions that were established to support work in the area of solid waste management. The institutions are the LCC and the ECZ. The other institutions established came under the LCC; one such institution is the community based enterprise *Samarila Ukhondo*.

The MBA was another institution that performed the function of removing waste from the market and areas around. The association had an aggressive system of collecting money from its member. It compelled each member contribute the K4000.00 per day or K120, 000.00 per month levy. This meant that the association had enough money to hire private companies to collect waste from the communal dumpsite to the final disposal site in Chunga. This was the role to be performed by the local authority. The association paid the community based enterprise *Samarila Ukhondo* K 300,000.00 to collect waste from the market and surrounding areas. As a result of this, the association managed to effectively remove waste within its domain.

The LCC operated under the framework of the statutory instrument No 91 of 2004, the Local Government Act (cap281 volume 16 of the laws of Zambia). The Act provided the local authority the mandate to punish offenders regarding disposal of solid waste within

the city. In its existence the Act was adequate in providing for the functions and operations of the local authority.

The failure by the local authority to adequately remove waste was due to lack of the institution's capacity to deal with issues of enforcing the law. The Council could not bring to book offenders against disposal of waste such as burning. Burning of waste in an open fire is prohibited by the by laws (Appendix IV). Dumping along roads or non designated area is against the by laws, but the Council did not enforce it. Inadequate finance was the other reason that contributed to the failure by the Council in areas of waste management. Due to lack of finance the local authority failed to collect waste from the communal dumpsite on a regular basis. It also came to light that the Council only had few waste collection trucks that would go round all the designated residential areas in the city to collect waste.

The ECZ was established under the statutory instrument No 71 of 1993. The Act under this was the EPPCA. The Act and its provisions empowered the ECZ to regulate legislation, disseminate information and coordinate activities of solid waste management. It was highlighted from the results that the legal framework within which the Council operated was adequate in dealing with issues of waste management. However, as was the case with the local authority, the ECZ lacked capacity to monitor, regulate and enforce the provisions of the Act. This was due to limited number of inspectors to go round enforcing the law.

CHAPTER SEVEN: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Summary

The study revealed that there were a number of strategies residents of Kamanga compound adopted. The residents were the major generators of solid waste, as such they were involved in the management of waste. Waste management strategies practised included temporal storage of waste in different kinds of receptacles for further collection and disposal by the community base enterprise *Samarila Ukhondo*. Other residents buried waste generated in their backyards, others burnt the waste they generated. Finally there were those residents who used part of the waste they generated in their small backyard gardens or used pits for dumping of waste.

The kind of solid waste generated by the community was categorised into three, organic; inorganic and a mixture. Organic mostly comprised vegetative material and food remains while inorganic comprised mainly plastic, paper and construction debris. Most of the residents generated a mixture. The waste was not sorted at the point of generation.

The community based solid waste management strategies adopted in Kamanga as a whole had a number of key actors. The actors included the generators in this case the individual household, the transporters, which were the community based enterprise *Samarila Ukhondo*, the LCC and MBA responsible for waste management from communal dumpsite and the market areas respectively. Each of these actors had a crucial role to play

in the management of solid waste and to have an efficient waste management system each of these needed to play their part efficiently.

Despite having community based solid waste management strategies in Kamanga, there still was a collection of waste around maiden boxes and roads within the compound. Whilst the strategies adopted worked well at household level, at community level the waste management system in place was not effective in removing waste from the community. *Samarila Ukhondo* was the community based enterprise responsible for the door to door collection of waste at a fee of K 1, 500.00 per wheel burrow. This was the source of funds for the CBE. The MBA was responsible for clearing waste from the market and the surrounding areas. It got its funds from market levies it charged its members. It effectively removed waste from the market and surrounding areas. At communal level, the LCC was responsible for collection of waste from the communal dumpsite to the final disposal site. The Council is funded by the government and donor support came from the Danish government.

The Institutions in place lacked the capacity to effectively enforce the laws and by laws regarding waste management. The existing legal frameworks, the EPPCA, Waste Management Regulations and the Local Government Act, the LCC by laws 2004 are adequate in management of waste. The inadequacies came in the enforcement of these laws by the ECZ and the LCC. Other than the lack of capacity of the institutions, inadequate funding to the institutions was one of the major factors that affected the operations of the institutions.

7.2 Conclusions

Various waste management strategies were used by different households. Each household adopted a strategy that it could afford in terms of finances and physical space within the yard. The households that had enough space in the back yard could afford to use pits. Temporal storage of waste was the most widely used strategy among the households in Kamanga. This suited most of the residents as it gave them time to look for money to pay *Samalira Ukhondo* for collection.

The actors involved in the management of waste were the residents, the CBE *Samarila Ukhondo*, the MBA, the LCC and the ECZ. Except for the MBA, all the other actors did not adequately perform their roles. This resulted in waste accumulating in areas around the maiden boxes and along roads and footpaths in the compound. In terms of the generators of waste, not all paid for waste collection services. Where possible, they only paid when funds were available and what was available. There was no law to compel residents to pay to *Samalira Ukhondo* for waste collection services. This created a problem as the enterprise could only collect waste from residents that paid for the service yet even those that did not pay for the services generated waste.

The LCC failed to remove waste from the communal dumpsites. This discouraged the partnership with the CBE working in the area and the residents. This was the main cause for failure of the strategy as it discouraged community participation.

Regarding the legal frame work and the institutional framework, it can be concluded that these are adequate in dealing with the problem of waste management in Kamanga. What is lacking is the enforcement of the laws and the institutional capacity to adequately deal with issues of waste management by the LCC and ECZ respectively.

It can be concluded that the various strategies adopted at household level were effective in removing waste at that level and that these strategies can better work if all the households paid waste collection fees to *Samarila Ukhondo*. At the communal level, the strategy failed to remove waste in spite of having adequate legal and institutional frame works in place.

There is no apparent relationship between the amount of waste generated at a household level and the size of the household as some waste is removed immediately after it is generated

7.3 Recommendations

After having undertaken the study on community based solid waste management strategies in Kamanga compound, the following recommendations were made.

1. There is need to increase the number of communal dumpsites in the compound. This can be by way of putting up skips or another maiden box

in the open area near the grounds in overspill one or along one of the roads in overspill two. Since the community has no financial resources for this, the community can be mobilised so as to contribute either financially or in form of labour. To waste management services.

2. The LCC to be introduce a prescribed levy for solid waste management paid together with the land rate for each land owner to the LCC.
3. The LCC in conjunction with the RDC organise community education campaigns on the need for individual household to pay for the waste collection service and utilise the communal dumpsite. Emphasis to be on the benefits of having a clean environment. This can be achieved through charging heavy penalties as prescribed in the act and enforced by the recently launched clean Zambia campaign.

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Appendix I

COMMUNITY BASED SOLID WASTE MANAGEMENT IN LUSAKA'S KAMANGA COMPOUND

QUESTIONNAIRE FOR HOUSEHOLDS.

Kindly be assured that the information obtained shall be treated with utmost confidence and shall only be used for academic purposes.

A. GENERAL INFORMATION

AGE.....

LEVEL OF EDUCATION ATTAINED.....

NUMBER OF OCCUPANTS.....

B. PRIMARY METHODS OF WASTE DISPOSAL

1. Approximately how much of solid waste does your household generate in a week?

(A) <0.5 (B) 0.5-0.75 empty 25kg bag

(C) 0.76-1.0 empty 25kg bag (D) >1 empty 25kg bag.

2. What category of waste dominates the waste produced in your household?.....

3. After generation, what do you do with the waste?

(A) Burn it (B) Store it (C) Bury it (D) Other

Give detail.....

4. If stored, how much of the waste generated do you store?
(A) All of it (B) half of it (C) Three quarters (D) quarter (E) None
5. If stored, what kind of receptacle do you use to store the waste?
(A) Plastic bags (B) Bins (C) Sacks (D) Other improvised devices.

C SECONDARY METHODS OF WASTE DISPOSAL

- 6 Is there an organization/ company that collect waste from your Household?
Yes No.....
- 7 If yes, which organization/ company is this?
.....
- 8 How many times does it collect waste from your household in a week?
.....
- 9 Are there any organization/ Institution that collect waste from communal dumpsite in your area?
Yes..... No.....
- 10 If yes, what organization/ institution is it?
- 11 How many times does it collect waste from the communal dumpsite in a week?.....
- 12 How much do you pay for the services provided?.....

13 Are the services affordable to your household?.....

Affordable..... Not Affordable.....

Give details.....

14 Are the services offered effective in removing waste from your household?

Effective..... Not Effective.....

15 What is your role as a household in the management of waste in the area?

.....

16 In your opinion, how can the community be more involved in waste management and what can be done to improve waste collection in your area?

.....

.....

.....

THANK YOU VERY MUCH FOR YOU TIME AND COOPERATION

Appendix II

SOLID WASTE MANAGEMENT FOR PERI URBAN AREAS: THE CASE OF KAMANGA COMPOUND.

Kindly be assured that the information obtained shall be treated with utmost confidence and shall only be used for academic purposes.

INTERVIEW SCHEDULE FOR ORGANISATIONS

ADMINISTRATIVE INFORMATION

Name of Organization	
Name and title of contact person	
Contact address	
Email	
Nature of operation	

FUNCTIONS OF THE ORGANISATION

1. what role does your organization play in solid waste management in peri urban area of Kamanga?	
2. Under which law does your Organization perform its function?	
3. Are the existing legal structures adequate in Dealing with problems of waste management in peri urban areas such as Kamanga.	
4. If no, what is lacking in the existing law? (Briefly explain)	
5. Does your organization execute its function Through another established institution?	
6. If yes what institution is it and how does Your organization relate to the institution?	
7. If no, how does your organization execute Its functions? Give details	
8. What are the existing funding mechanism of Your organization regarding solid waste management in peri urban areas?	

9. In your view, What do you think should be done To improve the existing community based solid waste management strategies in peri urban areas?	
--	--

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION
Appendix III

SUMMARY OF FIELD DATA IN TABLES.

Waste management Strategies

		Frequency	Percent
Valid	Burning	23	19.2
	Storing	64	53.3
	Burying	12	10.0
	Other(eg manure treatment)	21	17.5
	Total	120	100.0

Quantity of waste stored at household level

		Frequency	Percent
Valid	All	64	53.3
	0.5	2	1.7
	0.75	6	5.0
	0.25	1	.8
	None	47	39.2
	Total	120	100.0

Receptacles used for storage

		Frequency	Percent
Valid	Plastic bags	2	1.7
	Litter bins	16	13.3
	sacks	34	28.3
	Other improvised devices	23	19.2
	not applicable	45	37.5
	Total	120	100.0

Actors involved at Household level

		Frequency	Percent
Valid	Council	3	2.5
	CBE (Samalira ukhondo)	63	52.5
	Not applicable	53	44.2
	Total	119	99.2
Missing	System	1	.8
Total		120	100.0

Frequency of waste collection from households

		Frequency	Percent
Valid	1 to 2	61	50.8
	3 to 4	4	3.3
	Every day	2	1.7
	Not applicable	53	44.2
	Total	120	100.0

Waste collection user fees

		Frequency	Percent
Valid	Paid	67	55.8
	Not paid	51	42.5
	No response	2	1.7
	Total	120	100.0

Type of Waste Generated

		Frequency	Percent
Valid	Organic (leaves ash etc)	38	31.7
	Inorganic (Paper plastic etc)	33	27.5
	Mixture of both	49	40.8
	Total	120	100.0

Amount of waste generated

		Frequency	Percent
Valid	<0.5	106	88.3
	0.5-0.75	11	9.2
	0.76- 1.0	2	1.7
	> 1	1	.8
	Total	120	100.0

Effectiveness of the Strategies

		Frequency	Percent
Valid	Effective	64	53.3
	Not effective	8	6.7
	No response	48	40.0
	Total	120	100.0

Amount paid for collection

		Frequency	Percent
Valid	K500	6	5.0
	k1000 to 2000	63	52.5
	Above K 5000	1	.8
	Not applicable	49	40.8
	Total	119	99.2
Missing	System	1	.8
Total		120	100.0

Affordability of waste collection user fees

		Frequency	Percent
Valid	Affordable	46	38.3
	Not Affordable	29	24.2
	Not applicable	45	37.5
	Total	120	100.0

Correlations

		Occupancy	amount of waste generated
Occupancy	Pearson Correlation	1.000	.001
	Sig. (2-tailed)		.990
	N	120	120
amount of waste generated	Pearson Correlation	.001	1.000
	Sig. (2-tailed)	.990	
	N	120	120

Appendix IV.

*Supplement to the Republic of Zambia Government
Gazette dated Friday, 29th October, 2004*

GOVERNMENT OF ZAMBIA

STATUTORY INSTRUMENT No. 91 OF 2004

**The Local Government Act
(Laws, Volume 16, Cap. 281)**

**The Lusaka City Council (Municipal Solid Waste
Management) By-Laws, 2004**

In EXERCISE of the powers contained in sections *seventy-six*
and *seventy-nine* of the Local Government Act, the following
By-Laws are hereby made:

1. These By-Laws may be cited as the Lusaka City Council.
(Municipal Solid Waste Management) By-Laws, 2004.

Title

2. In these By-Laws, unless the context otherwise requires-

“Council” means the Lusaka City Council;

‘Environmental Council of Zambia’ means the Environmental
Council of Zambia established under the Environmental
Protection and Pollution Control Act;

‘hazardous waste’ means waste which is explosive, oxidising,
flammable, irritating, harmful, toxic, carcinogenic, corrosive,
infectious, teratogenic, mutagenic, ecotoxic.

“municipal solid waste” means solid waste generated by human
activity in an urban environment but does not include hazardous
waste.

‘pay point’ means any place within the Council area designated
by the Council for the payment of a solid waste management fee.

‘solid waste’ means any waste substance that is not fluid;

‘tender’ shall have the meaning assigned to it by the Zambia
National Tender Board Act

‘waste’ means any substance or object that the owner (user)
discards or is obliged to discard;

‘waste disposal’ means the depositing of waste above or under
ground with the aim of permanent storage;

‘waste disposal facility’ an area of land designated by the
Council for the disposal of waste.

‘waste management’ includes solid waste collection,
transportation, sorting, recycling, treatment, composting, energy

Title

Interpretation

Cap 204

Cap394

recovery, incineration and disposal;
'waste Management District' means an area so zoned for the purpose of waste management and for which the Council may engage a waste manager.
'waste Management Unit' means the Waste Management Unit established under by-law 4;
'waste manager' means any person who is engaged by the Waste Management Unit to provide waste management services; and
'waste producer' means any person who generates waste as result of their activities.

Interpretation

3. (1) These By-Laws shall apply to the management of municipal solid waste generated in, imported into or transferred through the City of Lusaka and other waste which is managed together with or in the same facility as the municipal solid waste.

(2) The provisions of these By-laws shall bind all waste producers, waste managers, collectors, transporters and recyclers residing or conducting business in the city of Lusaka.

4. (1) There shall be a waste Management Unit of the Council which shall be responsible for, and coordinate activities related to, municipal solid waste management within the area of the Council.

(2) Notwithstanding the generality of sub-by-law (1) the waste management unit shall—

(a) advice to the Council in relation to the preparation and conclusion of municipal solid waste management contracts with any person;

(b) Publish in the Gazette and in a daily newspaper in circulation in Lusaka, for three consecutive days, the fees which are to be charges by waste managers as solid waste management fees;

(c) on behalf of the Council, ensure that waste managers are appointed, by tender, on a competitive basis in order to ensure that waste managers provide economic and costeffective municipal solid waste collection service;

(d) undertake inspections of waste management district in which waste managers have been appointed;

(e) operate, in accordance with the requirements of a permit issued by the Environmental Council of Zambia, such solid waste disposal facilities as the Council may determine.

Provided that the Waste Management Unit may for purposes of this paragraph engage agents who are not involved in other waste management activities to operate solid waste disposal sites; and

(f) collect fees from persons who dispose of solid waste at

Application

Establishment
of waste
Management
Unit

the facilities referred to in paragraph (e).

(3) The Council may, for the purposes of performing its functions under these By-laws, engage waste managers for Waste Management Districts.

5. (1) The Council shall appoint inspectors to monitor, inspect and enforce the provisions of these By-laws.

Appointment
Of inspectors

(2) The Town Clerk shall issue an identity card to each inspector.

6. (1) An inspector shall have power, on production of an identity card issued to the inspector under sub by-law (2) of by-law 5 to enter upon and inspect the premises, not being the inside of a dwelling house, of any waste producer in order to ensure that the provisions of these By-laws are being complied with.

Powers of
Inspectors

(2) An inspector shall ensure that a waste manager has made adequate arrangements for the provision of waste management services in accordance with a contract signed between the waste manager and the Council.

(3) An inspector may order any waste producer who has piled waste in contravention of these By-laws to remove the waste at the waste producer's own expense to a waste disposal site within such period as may be specified by the inspector.

7. (1) The Council shall charge such fees for solid waste collection, transportation, disposal, street sweeping and storm drain clearance as the Council shall determine.

Fees

(2) The Waste Management Unit shall for purposes of notifying waste producers of the waste management fees referred to in sub-by-law (1), twice in every year, publish a notice in the Gazette and in a daily newspaper, for three consecutive days, specifying the fees to be paid by waste producers as waste collection fees:

Provided that the Waste Management Unit shall, every time the Council alters the waste collection fees, by notice published in the Gazette and a daily newspaper for three consecutive days, notify waste producers of any such alteration in the collection fees within fourteen days of the Council's resolution.

(3) The Council may charge different collection fees for different Waste Management Districts.

(4) The Waste Management Unit shall collect the fees for the collection of waste from households at such pay points as the Council may designate and shall issue an official receipt for each payment:

Provided that the Waste Management Unit may engage community based organisations or other agents for purposes of collecting waste collection fees from household waste producers.

8. (1) A waste producer shall facilitate the removal of solid waste from their premises by placing the waste bin or receptacle in a place near the entrance to the premises on the day that the waste manager shall collect the waste.

Duties of
Waste
Producers

(2) Subject to by-law 13 a waste producer shall use the solid waste management system established by the Council where such system is in operation upon payment of a solid waste collection fee.

(3) A waste producer who resides or operates a business in a Waste Management District shall, on such terms and conditions as the waste producer and the waste manager may agree upon, conclude a contract with a waste manager contracted to provide solid waste management services in such Waste Management District.

9. (1) Waste producers shall use such waste bins or other waste receptacles as the Waste Management Unit may determine for the storage of waste and such bins or receptacles shall be fitted with lids.

Use of Waste
Bin or
Receptacle

(2) Waste receptacles shall acquire, at their own expense, the waste bins or receptacles referred to in sub-by-law (1) unless such bins or receptacles are provided by the waste manager as a term of a contract entered into by a waste producer and a waste manager under sub-by-law (3) of by-law 8.

(3) A waste producer shall ensure that a waste receptacle which is in the form of a bag or bin and is meant to be emptied manually into a waste collection vehicle does not when filled exceed a maximum weight of forty kilograms.

(4) Waste shall not -

(a) be placed next to or on top of waste receptacles; or

(b) be burnt in a waste receptacle.

10. A waste manager shall -

Duties of
Waste
Managers

(a) operate in accordance with a licence to transport waste issued by the Environmental Council of Zambia; and

(b) within the boundaries of the Waste Management District in respect of which the waste manager has concluded a solid waste management contract with the Council.

11. (1) Once presented for disposal or recycling ownership of the solid waste so presented shall vest in the waste manager:

Ownership of
Waste

Provided that where the waste producer is able to show that it was not the intention of that waste producer to dispose of the item in question the waste manager shall, where practicable, return the item to the owner.

(2) Once presented to the Council for disposal at a waste disposal facility operated by, or on behalf of the Waste

Management Unit, ownership of the solid waste so presented shall vest in the Council unless the waste producer is able to show that it was not the intention of such waste producer to dispose of the any item in question in which case the Council shall, where practicable, return the item to the waste producer. (3) Where an item which is claimed under sub-by-law (1) or (2) has already been disposed off by the waste manager or the Council, the waste manager or the Council shall not be obliged to search for such item:

Provided that a waste producer may under the supervision of an officer from the Waste Management Unit, and at their own expense search for and retrieve the item if it is possible to search for and retrieve the item without risk to the health or safety of the waste producer or any other person.

12. A person shall not within the boundaries of a Waste Management District -

- (a) on private or public land, burn waste in an open fire or in a furnace;
- (b) on private or public land, bury waste;
- (c) accumulate or keep waste upon any premises beyond the regular collection period stipulated by the waste manager concerned; or
- (d) deposit or place waste in any street, storm water drain, premises (whether vacant or not), water course, reservoir, forest or any place not intended for waste disposal as a means of permanently disposing of the solid waste

Prohibitions
of burning etc
of solid waste

13. (1) A body corporate or company which has obtained a licence to transport waste from the Environmental Council of Zambia and concluded a contract with the Council for the disposal of waste at a waste disposal facility operated by, or on behalf of, the Waste Management Unit, shall be exempt from the Provisions of sub-by-law (2) of by-law 8.

Exemptions

(2) The composting of organic waste shall be exempt from the provisions of paragraph (b) of by-law 12 provided that the composting of such waste does not cause a nuisance or pollute the environment.

14. (1) A person who is not satisfied with the quality of service provided by a waste manager may, in writing, complain to the head of the Waste Management Unit who shall register every such complaint upon receipt.

Complaints

(2) The head of the Waste Management Unit shall respond in writing to the complaint received under sub by-law (1) within thirty days of receiving the complaint and shall, where appropriate, require the Waste Manager to take such measures

to rectify the situation leading to the complaint within such period as the head of the Waste Management Unit shall direct.

(3) Where the head of the Waste Management Unit does not respond to the complainant within the period stipulated in sub by-law (2) the waste producer may complain to the Town Clerk who, upon receipt of the complaint, shall direct the head of the Waste Management Unit to respond to the complaint in accordance with sub by-law (2).

(4) A waste manager against whom a complaint is brought under this by-law and who is required, by the head of the Waste Management Unit, to rectify the situation shall upon so rectifying the situation, in writing notify the head of the Waste Management Unit of the steps taken to rectify the situation complained against.

Complaints

15. (1) Any person who contravenes any provision of these By-laws commits an offence and shall be liable upon conviction -

(a) in the case of a first offence, to a fine not exceeding eighty penalty units or imprisonment for a period not exceeding six months, or both; and

(b) in the case of a second or subsequent offence to a fine of sixteen penalty units for each day during which the contravention continues.

(2) In addition to any penalty prescribed by sub by-law (1) the court may order that any expenses incurred by the Council in consequence of such contravention shall be paid by the person committing the contravention.

Offences Penalties

L. MKANDAWIRE,

Mayor,

Lusaka City Council

F. MUWOWO,

Town Clerk,

Lusaka City Council

Confirmed by me this 18th day of October, 2004.

S.T. MASEBO,

Minister of Local Government

and Housing

LUSAKA

Appendix V

GOVERNMENT OF ZAMBIA

STATUTORY INSTRUMENT NO. 71 OF 1993

The Environmental Protection and Pollution Control Act (Act No 12 of 1990)

The Waste Management (Licensing of Transporters of Wastes and Waste Disposal Sites) Regulations, 1993

IN EXERCISE of the powers contained in sections *fifty-five* and *ninety-six* of the Environmental Protection and Pollution Control Act 1990, and in consultation with the Council the following Regulations are hereby made:

Title

1. These Regulations may be cited as the Waste Management (licencing of Transporters of Wastes and Waste Disposal Sites) Regulations, 1993.

2. In these Regulations unless the context otherwise requires:-

Interpretation

"disposal site" means the land or water area on which waste disposal facilities are physically located;

"Inspectorate" means the Environmental Inspectorate established under section *eighty-one* of the Act; and

"wastes" subject to regulation 3 includes hazardous wastes and shall have the meaning assigned to them in the Act.

3. These Regulations shall not apply to -

- (a) domestic waste from residential household of forty-five kilograms weight or less per week; and
- (b) the transportation of construction and demolition debris to licenced disposal sites.

Application

4. (1) A person intending to transport wastes or operate a waste disposal site or plant shall apply for a licence to the Inspectorate in Forms WM1 and WM2 of the First Schedule respectively and shall be accompanied by the appropriate fee set out in the Second Schedule.

Application for
licence to
transport wastes
or operate waste
disposal plant

(2) A person who transports wastes or owns or operates a waste disposal site or plant before the commencement of these regulations shall apply for a licence within thirty days from the commencement of these Regulations

5. (1) The Inspectorate shall issue a licence to transport wastes in form WM3 of the First Schedule if:-

- (a) satisfied that the applicant has adequate and appropriate facilities and equipment to transport wastes without causing significant damage to the environment;
 - (b) satisfied with collection schedule of wastes of the applicant; and
 - (c) the Inspectorate has published its intention to issue the licence by notice in the *Gazette*, twenty-eight days before the issue of the licence
- (2) A licence to transport wastes shall be subject to the following conditions:
- (a) the collection and transportation of wastes shall be conducted in a manner that would not cause scattering of the waste.
 - (b) the vehicles, pipelines and equipment for the transportation of waste shall be in such a state as not to cause the scattering of or the flowing out of the wastes or the emitting of bad smells from the wastes.
 - (c) the vehicles for the transportation of wastes shall follow the approved schedule routes from the point of collection to the disposal site or plant.
 - (d) the personnel involved in the collection and transportation of wastes shall be provided with -
 - (i) adequate protective and safety clothing;
 - (ii) adequate appropriate equipment or facilities for loading wastes; and
 - (iii) safe and secure sitting facilities in the vehicles for transporting wastes.

(2) A person who transports wastes or owns or operates a waste disposal site or plant before the commencement of these regulations shall apply for a licence within thirty days from the commencement of these Regulations

5. (1) The Inspectorate shall issue a licence to transport wastes in form WM3 of the First Schedule if:-

- (a) satisfied that the applicant has adequate and appropriate facilities and equipment to transport wastes without causing significant damage to the environment;
 - (b) satisfied with collection schedule of wastes of the applicant; and
 - (c) the Inspectorate has published its intention to issue the licence by notice in the *Gazette*, twenty-eight days before the issue of the licence
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 - (c) the vehicles for the transportation of wastes shall follow the approved schedule routes from the point of collection to the disposal site or plant.
 - (d) the personnel involved in the collection and transportation of wastes shall be provided with -
 - (i) adequate protective and safety clothing;
 - (ii) adequate appropriate equipment or facilities for loading wastes; and
 - (iii) safe and secure sitting facilities in the vehicles for transporting wastes.

- (e) the personnel involved in the collection and transportation of wastes shall undergo an annual medical check up.
- (f) any other condition which the Inspectorate shall consider relevant for the transportation of wastes.

(3) licence to transport wastes shall be valid for thirty-six months and may be renewed for a like period:

Provided that the Inspectorate may limit the validity of the licence for any period less than thirty-six months but not less than six months, when necessary.

(4) An inspector may at any reasonable time stop and inspect any vehicle used for the transportation of wastes.

6. (1) The Inspectorate shall issue a licence in Form WM4 of the First Schedule to own or operate a waste disposal site or plant if -

(a) approval has been obtained from the town and country planning authority on the location of the waste disposal site or plant:

Licence to
own or
operate a
waste disposal
site or plant

(b) satisfied that the owner or operator of the waste disposal site or plant has the ability and the appropriate facilities to manage the waste disposal site or plant without causing significant damage to the environment; taking into account the summary of the environmental impact statement submitted by the owner or operator, and

(c) notice has been given by the *Gazette* on the proposed waste disposal site or plant, twenty-eighty days before the issue of the licence

(2) A licence to own or operate a waste disposal site or plant shall be subject to the following conditions:

(a) The waste disposal site or plant shall be enclosed and secure from scavenging.

(b) The waste disposal site or plant shall have hazard and safety signs displayed at appropriate places indicating the disposal site or plant.

(c) The waste disposal site or plant shall be operated in a way which would :-

- (e) the personnel involved in the collection and transportation of wastes shall undergo an annual medical check up.
- (f) any other condition which the Inspectorate shall consider relevant for the transportation of wastes.

(3) licence to transport wastes shall be valid for thirty-six months and may be renewed for a like period:

Provided that the Inspectorate may limit the validity of the licence for any period less than thirty-six months but not less than six months, when necessary.

(4) An inspector may at any reasonable time stop and inspect any vehicle used for the transportation of wastes.

6. (1) The Inspectorate shall issue a licence in Form WM4 of the First Schedule to own or operate a waste disposal site or plant if -

- (a) approval has been obtained from the town and country planning authority on the location of the waste disposal site or plant:
- (b) satisfied that the owner or operator of the waste disposal site or plant has the ability and the appropriate facilities to manage the waste disposal site or plant without causing significant damage to the environment; taking into account the summary of the environmental impact statement submitted by the owner or operator, and
- (c) notice has been given by the *Gazette* on the proposed waste disposal site or plant, twenty-eight days before the issue of the licence

Licence to
own or
operate a
waste disposal
site or plant

(2) A licence to own or operate a waste disposal site or plant shall be subject to the following conditions:

- (a) The waste disposal site or plant shall be enclosed and secure from scavenging.
- (b) The waste disposal site or plant shall have hazard and safety signs displayed at appropriate places indicating the disposal site or plant.
- (c) The waste disposal site or plant shall be operated in a way which would :-

- (i) avoid polluting surface and underground water;
 - (ii) avoid the emitting of bad smells from the site or plant to levels beyond that approved by the inspectorate;
 - (iii) prevent the breeding of rats, mosquitoes or other vermin at the site or plant.
- (d) The wastes at the disposal site or plant shall be compacted to a thickness of approximately three metres or less for each layer of wastes and each layer shall be covered with thirty centimetres of soil
- (e) Means of ventilation shall be provided at the disposal site or plant to remove gas generated from the disposal site or plant.
- (f) The personnel working at the waste disposal site or plant shall be provided with -
- (i) adequate protective and safety clothing;
 - (ii) adequate water and appropriate equipment or facilities for the operations of the disposal site or plant;
 - (iii) first aid facilities and training.
- (g) The personnel working at the waste disposal site or plant shall undergo an annual medical check up.
- (h) Human waste or sewage shall be disposed of at a waste disposal site or plant after sewage treatment
- (i) Measures to control and prevent scattering of papers or other light waste materials shall be installed at the waste disposal site or plant
- (j) Any other conditions which the Inspectorate shall consider relevant for the operation of the waste disposal site or plant.
- (3) A licence to own or operate a waste disposal site or plant shall be valid for thirty-six months and may be renewed for a like a period;

Provided that the Inspectorate may limit the validity of the licence for any period less than thirty-six months, but not less than six months when necessary.

(4) An Inspector may at any reasonable time, enter and inspect any waste disposal site or plant.

(5) Any person who:-

- (a) operates or owns a waste management disposal site without a licence;
- (b) discharges waste onto a site or plant which is unlicensed; shall be guilty of an offence.

7. (1) The holder of a licence under these Regulations shall -

- (a) keep a record of the licensed activities; and
- (b) submit the record referred to in paragraph (a) to the Inspectorate every six months from the commencement of the licensed activities.

(2) The Inspectorate may order the holder of a licence under these Regulations to install, at the expense of the holder of the licence, metering devices and to take samples and analyse them as the Inspectorate may direct.

8. The Inspectorate shall maintain a licences register of holders of licences to transport wastes or operate wastes disposal sites or plants.

9. (1) If the Inspectorate has reasonable cause to believe that a person is contravening any of the provisions of these Regulations or a condition of the licence or is likely to contravene any of the provisions of these Regulations or a condition of the licence, the Inspectorate shall serve an enforcement notice on that person.

(2) An enforcement notice shall:-

- (a) state the belief regarding the contravention or the likely contravention of the provisions of these Regulations or a condition of the licence and specify the matters constituting the contravention or making it likely that the contravention will arise, as the case may be;
- (b) specify the steps that have to be taken to remedy the contravention or avoid the contravention, as the case may be; and

Enforcement
notice

- (c) specify the time limit within which the steps described under paragraph (b) have to be taken.

10. Any person who contravenes any of the provisions of these Regulations or a condition of a licence after an enforcement notice has been issued under regulation 9:- Offence and penalties

- (a) shall have the licence revoked; and
- (b) shall be guilty of an offence and shall be liable upon conviction to a fine or conviction as set out in section *ninety-one* of the act.