

**A STUDY OF SOLID WASTE MANAGEMENT IN KAUNDA SQUARE,  
LUSAKA URBAN**

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Resources

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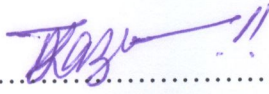
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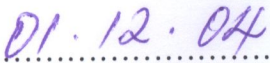
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## DECLARATION

I, Tresford Sikazwe, declare that this report has been composed and compiled by me and that the work recorded has been done by me, that the sources of all material referred to have been acknowledged, and that the project report has not been accepted in any previous application for academic award.

Signature:.....

Date:.....

## **DEDICATION**

To my dear wife, Rose and my wonderful children, Rogers, Martha, Mbita and Chisha for their encouragement and patience and for whom, most of the time I could not render the required time that they needed during the course of my studies.

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

<b>CBBE</b>	-	<b>Community Based Business Enterprise</b>
<b>CSO</b>	-	<b>Central Statistical Office</b>
<b>ECZ</b>	-	<b>Environmental Council of Zambia</b>
<b>EIA</b>	-	<b>Environmental Impact Assessment</b>
<b>ESP</b>	-	<b>Environmental Support Programme</b>
<b>IEC</b>	-	<b>Information, Education and Communication</b>
<b>LCC</b>	-	<b>Lusaka City Council</b>
<b>Ltd</b>	-	<b>Limited</b>
<b>MENR</b>	-	<b>Ministry of Environment and Natural Resources</b>
<b>NCS</b>	-	<b>National Conservation Strategy</b>
<b>NEAP</b>	-	<b>National Environmental Action Plan</b>
<b>PEF</b>	-	<b>Pilot Environment Fund</b>
<b>PUSH</b>	-	<b>Peri-Urban Self Help</b>
<b>RDC</b>	-	<b>Resident Development Committee</b>
<b>UNCHS</b>	-	<b>United Nations Center for Human Settlements</b>
<b>UNDP</b>	-	<b>United Nations Development Programme</b>
<b>UNEP</b>	-	<b>United Nations Environment Programme</b>
<b>USAID</b>	-	<b>United States Assistance International Development</b>
<b>WHO</b>	-	<b>World Health Organisation</b>

## ABSTRACT

Kaunda Square has been experiencing the problem of indiscriminate dumping of waste for a long time. The most affected areas include the markets, shopping centres, roads and streets, open spaces and school grounds. Lack of adequate and efficient solid waste service delivery system has contributed to unsightly conditions, offensive smells and poses a threat to diarrhoeal diseases transmitted by flies, rats and other vermin.

It is against this background that the study was aimed at investigating factors influencing indiscriminate disposal of solid waste in Kaunda Square. The objective of the study included examining the current storage systems at household and community levels; assessing the community's knowledge and attitude towards the dumping of solid waste; examining the impact of the community's based business enterprise on solid waste management; exploring the community's potential to participate in solid waste management; and assessing the community's strategies currently being used for management of waste.

The research design comprised a sample of 40 respondents. Random sampling was used to select the respondents who participated in the study. A questionnaire was administered to a randomly selected sample of 40 respondents.

The findings of the study reveal that Lusaka City Council has no capacity including equipment, funding and resources to manage solid waste. Consequently, LCC does not collect any waste from individual residences in Kaunda Square. This scenario has opened up prospects for private sector participation in solid waste management. In Kaunda Square, G.L Carriers (Z) Ltd. is the sole collector of waste.

Limited community involvement limits residents' participation and therefore they are not able to take up key roles in the management of waste. The study concluded that focus group discussions, surveys and public meetings are some of the necessary tools that can

be used in determining the concerns and opinions of various stakeholders. Nevertheless, results indicate that awareness amongst the population has built up naturally to a point where waste is regarded as an important issue.

Lack of appropriate storage receptacles at household level is also an added problem. Residents utilise refuse pits and their own dust bins to dispose of waste. Alternatively, the waste is simply dumped in an open, communal area. The waste dumped in this manner has a negative effect on the environment especially with respect to ground water contamination and public health in general. At community level, the communal containers provided are not adequate to provide quality and reliable service to meet the needs and aspirations of the community.

One important opportunity that should be exploited is the willingness of the community to pay for the collection of waste. However, residents have different affordability levels and therefore, there is need to accommodate a wider range of income groups that have varying needs. The current situation is that not everyone is paying for refuse collection because there is no appropriate collection mechanism put in place. This in turn limits the ability of the service provider to provide quality service to meet community's needs.

Bearing in mind the above findings, it is therefore imperative for policy makers and programme managers to devise solid waste management strategies appropriate to local circumstances that will deliver a sustainable community impact.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the study

The realization by the Zambian Government to integrate the environmental concerns into the social and economic development planning process is an indication of its commitment to facilitate through various stakeholders a comprehensive and holistic approach to managing solid waste in the country. The need for environmentally acceptable, yet cost effective solid waste disposal has become a priority in this country. The rapid urbanization and the growth of spontaneous settlements are taking place on such a scale that Central and Local Government cannot cope with the demand for decent living conditions such as effective solid waste management, sanitation and supply of clean water to residents.

It is not a secret to note that management of solid waste in Lusaka is considered as totally inadequate for a city of its magnitude. It is therefore imperative that all stakeholders including line ministries must get involved in order to bring back the beauty of Lusaka, the capital city of Zambia. UNDP (1999) report emphasizes the need for multi-sectoral cooperation and involvement of the private sector considering the fact that issues of solid waste are very complex because they interact with one another and cut across a wide range of urban development sectors and activities. For this reason, sustainable urban development requires a more inter-departmental, and cross-sectoral approach to the planning and management of solid waste in cities and towns.

At the city level, services often fail to reach new low-income areas, while existing municipal services rapidly deteriorate. It is true that a municipal service that seems to fail most is solid waste collection. In consequence, there is obvious environmental degradation that is caused by ineffective solid waste management. Improper storage, handling and dumping introduce diseases transmitted by flies,

rats, and other creatures that breed in such volumes of waste dumps. One other harm done to the environment is when the leachates from waste dumps seep into the ground waters causing major pollution and consequently causing a threat to the well being of humans.

## **1.2 Statement of the problem**

For a long time, the residents of Kaunda Square have voiced out through the media and even complained to the area member of Parliament for Munali Constituency about the huge volumes of refuse that have accumulated to unacceptable levels at market premises, open places and streets. In this respect, the fundamental question to answer is how this problem of solid waste that threatens the imminent outbreak of cholera in particular, and poses danger to other serious effects such as odour and unsightly conditions is likely to be resolved.

The study is therefore of paramount importance as it is intended to examine all potential delivery options such as community and private service partnerships aimed at improving solid waste management.

## **1.3 Purpose of the study**

### **1.3.1 Aim of the study**

The aim of the study is to investigate factors influencing indiscriminate disposal of solid waste in Kaunda Square. The study of the factors in question will form a basis for the formulation of management strategies aimed at achieving efficiency in terms of waste reduction and minimization.

### **1.3.2 Objectives of the study**

The objectives of the study are fivefold and they include:-

- To examine the current storage systems that are already in use at household and community levels and assess their impact on solid management.
- To assess the community's knowledge and attitude towards the dumping of

solid waste.

- To examine the impact of community based business enterprises in solid waste management.
- To explore the community's potential to participate in solid waste management.
- To assess the strategies the communities are currently using for solid waste management.

### 1.3.3 Research Questions

In order to determine the factors influencing indiscriminate dumping of solid waste, the following research questions were asked in line with the objectives of the study:

- What are the waste storage systems available at household and community levels?
- What is the community's attitude towards dumping of solid waste?
- Does the refuse collector provide an effective and reliable service to meet the community's needs?
- To what extent is the community's involvement in the management of solid waste?
- What are the community's strategies on solid waste management?
- What are the implications of the cost charged by the service provider on the overall management?

### 1.4 Justification of the study

In desire to improve the hygienic standard of the Peri-Urban areas and the city as a whole, Lusaka City Council in conjunction with the Environmental Council of Zambia embarked on the formulation of the district solid waste management strategy called "Solid Waste Management Plan Project" for the city. The strategic paper once it is out will cover management of all categories and classes of waste management of all categories and classes of waste generated in the district. The overall goal of this strategic paper is to put in place an effective, efficient and

sustainable solid waste management. Once the causal factors are established, they will enable the researcher to propose recommendations on the optimal options and sustainable solutions that are expected to be included in the Solid Waste Management Master Plan Project for Lusaka District and in particular for Kaunda Square.

### 1.5 **Scope of the study**

The study focused on the generation and storage of solid waste practices at household and community levels. It also examined the collection and transportation methods of waste from Kaunda Square to the final disposal point.

### 1.6 **Operational definitions of terms**

**Refuse:** refers to any unwanted materials and includes garbage, street sweepings, discarded paper, wrecked vehicles and any other materials that are not intended for use.

**Solid Waste:** refers to solid materials in the material flow pattern that is rejected by society or waste arising from domestic, commercial, industrial, agricultural and other human activities.

**Hazardous waste:** refers to the waste that poses a substantial danger, either immediately or over a period of time to human, plant or animal life and these include both solid and liquids, explosive substances, toxic chemicals or radioactive materials generated by hospital and research laboratories.

**Solid Waste Management:** constitutes generation, storage, collection, transportation and final disposal of solid waste.

**Municipal Waste:** comprises domestic waste, trade and industrial wastes including hospital waste.



**Community:** refers to the local setting comprising a group of people or population

**Community Participation:** refers to sufficient involvement of community members in decision making and their active participation in community based programmes.

**Garbage:** describes food waste from food marketing preparation and consumption.

**Domestic waste:** refers to the waste that results from household activities which include sweepings, food preparation and gardening. The waste may be composed of vegetables, paper, plastics, rags, glass and litter.

**Trade and Commercial waste:** describes the waste arising from activities in retail outlets, barbershop, restaurants, outdoor and indoor markets. The waste consists of food waste, putrescibles, wooden articles, metals, paper, vegetables etc.

**Institutional waste:** refers to the waste generated by schools, police post, government clinic, churches and play grounds. The waste may include residential elements with high content of paper as well as medical waste. Thus, the solid waste generation is limited to domestic waste from households, trading waste from the markets and retail shops as well as from institutional houses.

## 1.7 **Organization of the study**

The study comprises seven chapters. Chapter one is the introduction which highlights the background to the study, statement of the problem, purpose and justification of the study. Chapter two discusses literature that was consulted related to solid waste management. The description of the study area with map illustrations is presented in chapter three. Chapter four gives highlights on the sources of information and also provides details of the research design. Chapter

five presents the results of the study in form of tables, pie charts and bar graphs. Analysis of the results is also done in this chapter. Chapter six discusses the implications of the results and constraints. The summaries and conclusions are presented in chapter seven which also incorporates the recommendations that have been suggested based on the critical and careful interpretation of the results. This chapter concludes the report.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

Solid Waste Management has been described as a cornerstone to the prevention of communicable diseases as well as the creation of beauty in towns and cities (Flintoff, 1976). There is obvious environmental degradation caused by ineffective solid waste management. The visual offensiveness of street litter and the destruction of beauty of the countryside by uncontrolled dumping of solid waste are distressing. Improper storage, handling and disposal of waste introduces diseases transmitted by flies, rats and other vermin that breed in such dwellings. Where incineration is undertaken, as in private homes, choking smoke and offensive smells are another source of pollution. Uncollected garbage is known to generate dangerous gases, such as methane and carbon dioxide, through biological/chemical degradation processes, which could cause explosions of fire (Agyemang, 1997). Consequently this has caused a threat to the well being of the residents.

#### **2.1 Solid Waste Management at Global Scale**

In most developing countries the major problem in towns and cities is the uncoordinated planning of residential and commercial areas. Lack of planning often shows itself in the form of inadequate provision of social services. This in turn encourages indiscriminate dumping of solid waste. The spontaneous settlements are relatively a new phenomenon which is giving rise to a number of sanitary problems in most developing countries. One of them being solid waste management. These informal settlements are often situated outside the boundaries of cities and towns but are functionally part of the city because the majority of the inhabitants earn their living in the city (UNEP,1995). Sanitary conditions in urban settlements are frequently worse than those in remote rural areas.

UNEP (1995) compares the days of primitive society and those of modern society on how humans and animals have used the resources of the earth to support life

and to dispose of the waste. UNEP (1995) argues that in the early times the disposal of humans and other waste did not pose significant problems, for the population was small and the amount of land for the assimilation of waste was large. On the other hand, Tchobanoglous, et al. (1977) trace the problems of waste disposal from the time when humans first began to congregate in tribes, villages and communities and the accumulation of waste then became a consequence of life. Flintoff (1976) cites some effects of solid waste and says, "Without adequate solid waste disposal storm water will not be managed, thus accumulated domestic refuse is the most common cause of blockage of urban drainage systems". Flintoff (1976) argues that although smaller amounts of refuse per person is created compared to developed countries, the rate at which flies breed in the warm climates and mainly vegetable refuse of the third world cities means that collection have to be made more often, usually daily or three times a week. "Solid waste in towns lead to breeding of rats and the outbreak of plague epidemic that killed half the Europeans in the 14<sup>th</sup> century and caused many subsequent epidemics and high death toll (Tchobanoglous et al., 1977). Historically therefore, Public Health was the motivation for removing solid waste from the human habitat. During the late part of the 19<sup>th</sup> century municipalities made an effort to control the waste by hauling these solid residues to a "dump" located on the edge of the town or city. Garbage was commonly collected and fed to swine.

At global level, the day to day solid waste management is a complex and costly undertaking. The volumes of the waste generated by various sectors of the growing economies of the third world have considerably increased posing a major environmental problem. Holmes (1984) agrees with the view point and further suggests that the economic conditions of the developing countries demand less capital intensive systems. Labour intensive methods will also reduce the foreign exchange required for vehicles and other spare parts which may be difficult for a local authority to obtain (Holmes, 1984). Unfortunately, municipalities in developing countries often still prefer more complex vehicles where handcarts or tricycles would suffice. Expensive mechanized composting and incineration

plants are imported and not often used due to unsuitability of high running costs.

## **2.2 The Zambian Situation**

Zambians over the years have developed strategies and a number of policies that specifically addresses environmental concerns and the problems that the country is facing. It is however, important to note that strategies and policies did not specially focus on solid waste management, although other sectors such as water supply and sanitation received special attention (Matenga and Muyakwa, 1999). The Zambian Government has put in place policy and legal framework dealing with solid waste management in the country. The National Conservation Strategy (NCS) was adopted in 1985 by the Government and its main objective is to integrate the environmental concerns into social and economic development planning process of the country. The 1992 National Environmental Action Plan (NEAP) was a follow up to consolidate the objective of NCS. The NEAP was founded on three principles:

- The right of citizens to live in clean and health environment.
- The local community and private sector participation in national resources management.
- The obligatory Environmental Impact Assessment (EIA) of major development projects in all sectors.

## **2.3 Status of Solid Waste Management in Lusaka**

The Lusaka City Council is the regulatory institution for solid waste management in the city. The Lusaka City Council (LCC) has several departments that deal with different aspects of delivering services to the urban population of Lusaka. The department responsible for Solid Waste Management is the Public Health Services Department with the Director as its Chief Officer who is assisted by a Deputy Director.

Agyemang, et al.(1997) report reveals that the 1993 study undertaken by LCC Directorate of Public Health quantified the solid waste generated in Lusaka on a daily basis at about 1400 tonnes of which only about 10% is collected by the

council. With 90% of the city's solid waste uncollected means the bulk of refuse generated per day remain uncollected as it is evidenced by mountains of solid waste found most commonly in peri-urban areas, markets and any open spaces in the City. As can be observed from the above Lusaka City Council has no capacity to fulfill its civic obligations in servicing the city adequately. This scenario has caused over the years the quality of Lusaka's environment to drastically deteriorate. One of the major impact of the mounting piles of rotting garbage is visual pollution. Other effects of uncollected solid waste include offensive odours, attraction of a swarm of flies and an army of rodents and their attendants the fleas, all of which contribute to the spread of diseases. According to ECZ/LCC (1997) report, the total quantity of solid waste staggered at 243 000 tonnes per year. Of the total, 69.5% of solid waste quantity was generated from high density areas alone. The lowest solid waste generators were hotels, which contributed 0.6% of all solid waste estimated to be generated by the city. ECZ/LCC (1997) report observes that they were other wastes generated in Lusaka that were not included in the report.

A recent study by sustainable Lusaka Programme on the status of Waste Management Contractors suggest that private sector currently has low capacity to fully engage in waste management (USAID, 2001). The records at Environmental Council of Zambia show that there are nine (9) main professional waste management contractors in the city although there is still quite a number of residents and industries transporting waste to the disposal site at Chunga. The figures also show the private sector only collected an estimated 20, 956 tonnes for the year ended 2001 and this is out of a possible 234, 329 tonnes of waste generated in Lusaka for the same year. The collection figures for the private sector represents a paltry 8.6% of the total waste generated. ECZ/LCC (1997) report reveals that Kaunda Square alone generated 9, 344 tonnes of solid waste in 1996 and it was estimated that 12, 328 tonnes would be produced by the year 2001.

## 2.4 **Classification of Solid Waste**

The type of solid waste generated in Lusaka can be categorized as domestic (residential), commercial, institutional, non hazardous, hazardous and special waste (street and park, demolition rubbles, tyres, derelict vehicles etc). The generation, storage, collection and transportation and final disposal of solid waste are what constitute the term “Solid Waste Management.” The legal responsibility of Lusaka City Council to manage solid waste in the city of late has been impaired by a number of factors, one of them being financial. It has been the policy of the City Council to encourage the involvement of the private sector. The USAID (2001) report reveals that Lusaka City Council has put in place legal framework for private sector participation in solid waste management. The private sector involvement is at two levels: Professional Waste Management Contractors with management companies established and essentially provide waste collection service to the residents and industries of Lusaka on a cost recovery basis. Secondly, medium and large scale enterprises including residents who generate more than 45kg of waste per week are required by law to be licensed by the Environmental Council of Zambia and these are then free to transport their own waste to the designated disposal site for which a private license can be applied for.

## 2.5 **Participation of Community Organizations in Solid Waste Management**

In Lusaka community based organizations that are working hand in hand with Lusaka City Council in the area of refuse removal are many. These attempts in peri-urban areas do not involve the private sector but community organizations only. Where the community attempted to supplement garbage removal, the work accomplished relates solely to the donor agenda priorities. In fact, most community attempts are donor driven or donor funded. These community organizations include the PUSH – Zambia, a non governmental organization operating solely in Zambia, is promoting assistance project in low income communities. The project is operational in Bauleni, Mtendere, Garden, Kalingalinga, Chainda and Chaisa. CARE PUSH is another non-governmental organization under Care International Zambia, totally different from PUSH

Zambia. CARE PUSH activities of garbage collection and disposal are carried out by communities under the supervision of the Community Development Officer in selected peri-urban areas of Lusaka. Irish Aid in Kamanga township is a community participatory project involved in garbage collection. STOP LIVE Anti Cholera Society is based in Chaisa township, a voluntary organization of 30 members whose objective is to help fight the occurrence and spread of cholera through garbage collection.

An effective refuse collection service needs good organization and depends on the cooperation of the public. If, for example, skip or other communal rubbish containers are not regularly emptied, people will cease to use them. On the other hand poor urban communities have known to make remarkable efforts, even sweeping their own streets, if they know that a vehicle will arrive at the agreed time to collect the sweepings. In support of this view point, Harpham, et al. (1988) cite a research that was conducted in Kebele in Addis Ababa where community participation in Solid Waste Management has shown positive results. The research reveals that an effective solid waste management depends on the cooperation and coordination between the community and municipality. A good example was that of Kebele town where small refuse containers were emptied into five skips twice weekly, the skips were emptied once a month by the municipality.



## **CHAPTER THREE**

### **STUDY AREA**

This chapter focuses on the description of the study area and thus outlines the location, climate, population distribution and housing, socio-economic activities as well as the nature of waste generated.

#### **3.1 Location**

Kaunda Square township is situated about 7Km from the main city centre on the Eastern part of Lusaka. The township is divided into two sections, namely, Kaunda Square Stages I and II (figures 1 and 2). Kaunda Square Stage I share borders with Munali on the Southern part, Chamba Valley on the Northern part, and Chudleigh on the Western part. Kaunda Square stage II share borders with Chainama on the Southern part, Chamba Valley on the Northern part and Chelstone on the Eastern part.

Kaunda Square lies approximately between latitudes  $15^{\circ} 22'$  and  $15^{\circ} 23'$  South and between longitudes  $28^{\circ} 21'$  and  $28^{\circ} 22'$  East. The approximate size of the township is  $1.26\text{Km}^2$ .

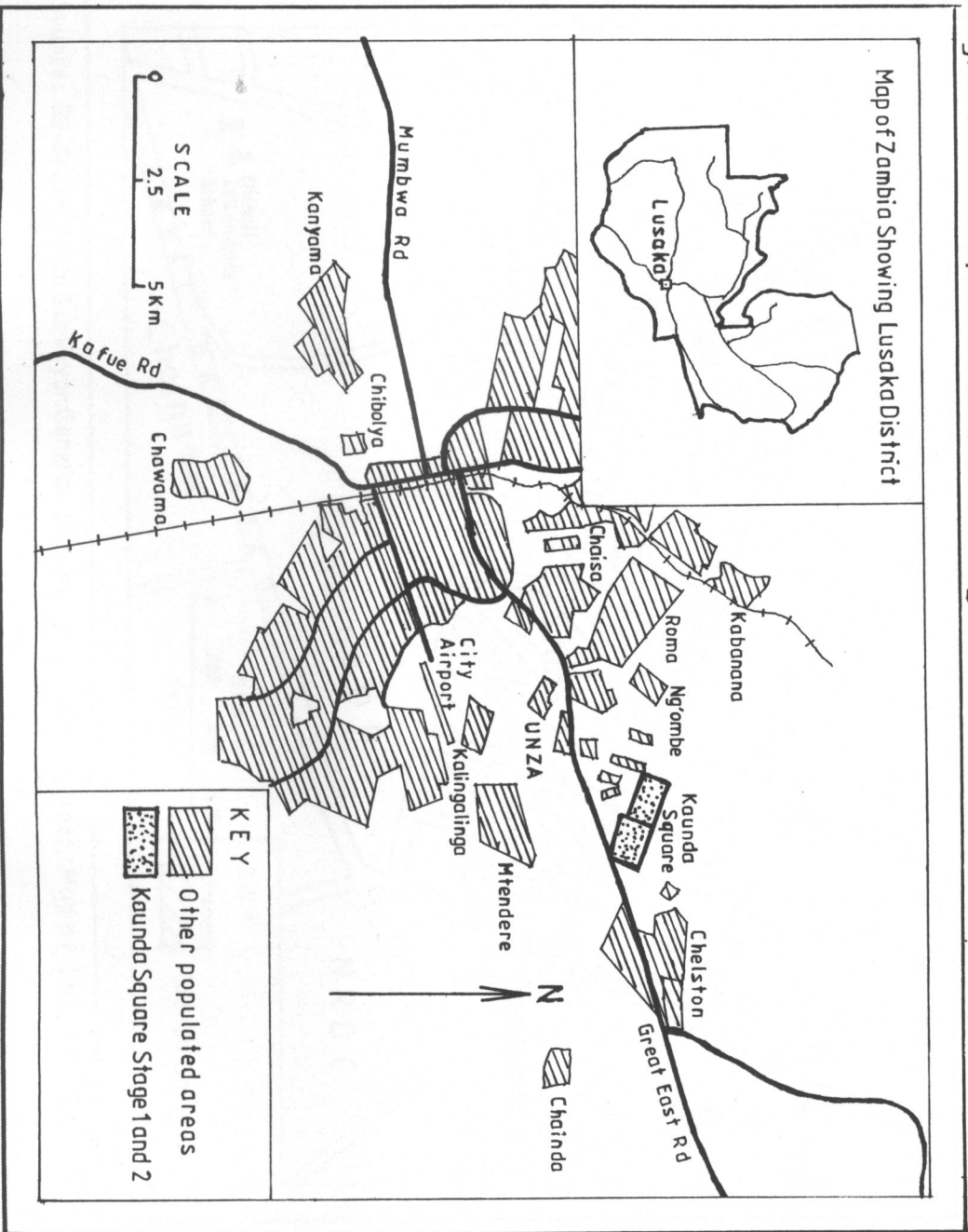
#### **3.2 Climate**

The City of Lusaka has a tropical type of climate to which Kaunda Square belongs. There are three distinct seasons: a warm rainy season from December to March, a cold season from April to August and a hot dry season for the rest of the year. The average temperature ranges from  $10^{\circ}\text{C}$  in the cold season and  $23^{\circ}\text{C}$  in the hot season with maximum temperature of 30 degrees Celsius in some cases.

Lusaka belongs to Region II Agro-ecological zone and therefore receives a mean annual rainfall of 800mm to 1200mm. During the rainy season, the management of solid waste becomes more difficult. This is the period when some main roads of the township become muddy and water logged, thereby making it more difficult for refuse trucks to have access to collection points. One of the

contributing factors to the poor state of main roads during the rainy season is poor drainage. Generally drainage soak pits or channels in Kaunda Square are absent at all points. Thus, waste water is allowed to drain away through natural formed drains in the paths and the water just flows to the lowest point where it infiltrates in the ground or forms a pool of waste water. This becomes a major threat to public health and has contributed to epidemics such as cholera and other diseases. Diarrhoeal disease is the most common and is associated with indiscriminate disposal of refuse especially during the rainy season. Although diarrhoeal diseases also occur during the cold and hot dry season, their occurrence are not as prevalent and severe as they are during the rainy season.

Fig. 1 Map of Lusaka Showing Location of Kaunda Square



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### 3.3 **Population distribution and Housing**

Kaunda Square is a high density conventional housing area. The housing units mostly comprise low and medium cost type of houses. The township has limited and sometimes absence of comprehensive public services such as garbage collection, vector control (spraying campaigns) and road maintenance services. Despite the fact that the township was well planned, the local authority failed to implement the plans through onsite supervision of road and street construction. This is particularly evident in Kaunda Square stage I where some roads are too narrow or poorly constructed to allow refuse trucks pass through. Although the refuse trucks need not go to every house, the distance in some cases between the transit points on some accessible roads and where some houses are situated is very large. This results in spillage of refuse during its transportation to the transit point because of long distance. Kaunda Square stage II has improved road network as compared to stage I. However, the geographical proximity of the township is good and affords accessibility for collection and transportation routes.

CSO (2000) reveals that the total population of Kaunda Square stands at 20, 325 with a total number of households standing at 3, 226 distributed as shown below: Stage I has a total number of 691 households with a population of 2, 607 females and 2, 424 males. Stage II comprises of 2, 535 households with a population of 7, 882 females and 7, 412 males.

### 3.4 **Socio-economic activities**

The information obtained from the Resident Development Committee records reveal that the majority of residents are self employed and a small proportion of the population is employed in the formal sector. The folding up of most companies, retrenchments and the general unemployment scenario in the city has forced most individuals to develop survival skills in order to meet their daily needs. Hence, the residents who are self-employed are engaged in activities such as street vending, carpentry, tailoring, block-making, charcoal trading, retail trading and other business ventures.

Kaunda Square has two major markets with small trading areas. Both markets in this section are active in terms of business transactions and business entrepreneurship.

### **3.5 Nature of waste generated**

The type of waste generated in Kaunda Square can be classified into three categories and includes domestic waste, trade and commercial waste, and institutional waste.

## **CHAPTER FOUR**

### **METHODOLOGY**

The chapter outlines the process of study and includes the sources of information, sample and sample size, methods used in collecting data, pre-test and data analysis.

#### **4.1 Sources of Information**

The data for solid waste management in Kaunda Square township was obtained through interviews with respondents, officials from the Residents Development Committee and literature review. Literature review provided information regarding the global picture of the problem of solid waste; institutional framework provided; and the current practice of managing waste in Zambia, particularly in Lusaka Urban. Most of the literature was obtained from Lusaka City Council and Environmental Council of Zambia. Interviews with respondents provided an in-depth information about storage collection, transportation and disposal of waste in Kaunda Square. Observations measured parameters such as seeing a resident throwing refuse in an open place or in a receptacle, and also seeing heaps of refuse alongside roads and streets. The study area was visited several times by the researcher in order to gain first hand knowledge by observations on the situation of solid waste.

#### **4.2 Research Design**

The study applied research design. This design was preferred by the researcher to discover the existence and extent of solid waste as a problem in Kaunda Square township. The research design included the following components:

##### **4.2.1 Sample and Sample Population**

Probability sampling was employed in the study that involved selection of the sample. Kaunda Square township has a total number of 3, 226 households. The study considered the household as a sampling unit. Each household was identified by its house number.

A simple random sampling, called the rotary method, was used in the selection of the sample. A sampling frame was established consisting of 3, 226 households. The sample size that was required was forty (40) households. The sample is a representative of the total population of Kaunda Square.

All house numbers listed were put in a container and shaken. By dipping the hand in the container, the house number was selected randomly until the number of forty (40) households was obtained. The sample included both male and female heads of households. In the absence of the head of the household, a mature person in the household was asked to participate in the survey.

#### **4.2.2 Data Collection**

A combination of both qualitative and quantitative methods of collecting data was used, hence the questionnaire comprised both closed and open ended questions. The quantitative method on one hand provided statistical data that facilitated comparison of numerical values. On the other hand, the qualitative method provided more information richness than volume, hence open ended questions provided with in depth information. The use of the two methods in information gathering helped the researcher to arrive at a broader, generated conclusion. It can therefore be concluded that the two methods compliment each other.

The questionnaire was prepared in English and it contained the same set of questions arranged in the same sequence (see appendix 1). The researcher administered the questionnaire to the respondents to ensure that all questions were fully answered. In addition to the questionnaire, direct observation method was used by the researcher, who noted and recorded events and artifacts as observed during the survey. The direct observation was necessary as it documented details that were found and therefore complimented the questionnaire's findings.

#### **4.2.3 Pre-test**

Obviously there is no questionnaire that can be perfect from the start. Therefore a pre-test to examine the instrument was conducted on (10) respondents, drawn



from Mtendere township. Mtendere township was chosen for the pre-test before the main study because it has the same characteristics as that of Kaunda Square township with similar over all setting. The pre-test was necessary because the researcher wanted to validate the questions themselves by adjusting ambiguous ones to make them understandable and clear. After the pre-test it was found imperative to add four more questions that were not originally contained in the questionnaire. The inclusion of these questions clarified certain issues that were not clear during the pre-test.

#### **4.2.4 Data Analysis**

In order to bring order, structure and meaning to the mass of the collected data, analysis was conducted and involved counting totals. Tables were used to summarize the information in terms of frequencies, figures and percentages.

### **4.3 Problems Encountered During the Survey**

#### **4.3.1. Time Limitation**

The issues related to solid waste management are taking a higher level of awareness worldwide. It is therefore appropriate to assume that a lot of studies have been conducted in this field and is easily available. However, it was not possible to consult all the relevant works and literature during the time allocated to this study. On the other hand, other organizations from the private sector are involved in solid waste management and these organizations were not consulted on the approaches and strategies they were using due to limited time.

Information collection from key informants was sometimes hindered by bureaucratic procedures encountered in many places. It was rather difficult to obtain necessary information at short notice because information was rather scattered in some offices.

#### **4.3.2 Respondent's Unavailability**

The other constraint experienced during the survey was the difficulty in finding the respondents at their homes. Even if they were available they would give

excuses. This therefore meant visiting the same households several times, even if it meant going back at awkward times as was agreed.

## CHAPTER FIVE

### RESEARCH FINDINGS

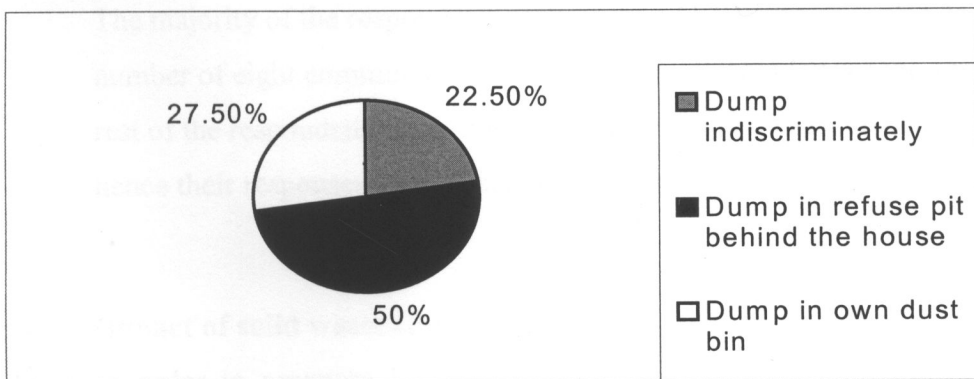
This chapter presents the results of the study. It describes the data that was collected from the field. All the questionnaires were duly completed indicating 100% response. The results are presented in line with the objectives of the study and are presented in form of tables, pie charts and bar graphs.

#### 5.1 Solid waste storage systems in use

In order to establish the forms of solid waste storage systems used at household level, respondents were asked to mention a storage system they used.

##### 5.1.1 Storage at household level

At the household level, three methods of waste disposal systems were identified as presented in Figure 3.



**Figure 3 Storage at household level**

Figure 3. shows that the refuse pits is the only final disposal system at household level which the majority of respondents could afford representing 50% response. 27.5% of respondents reported using their own dustbins as waste storage receptacles whereas 22.5% respondents indicated that they dumped the solid waste indiscriminately. However, no respondent mentioned about the polythene bags which were provided to some individuals by the local Community Business Enterprise.

5.1.2 Storage at community level

At the community level, a somewhat different picture emerged that is presented in Table 1 relating to the number of communal receptacles or containers in which the community is expected to dump its waste.

**Table 1            Storage at community level**

Number of refuse containers	Frequency	Percentage (%)
One	5	12.5
Two	3	17.5
Three	4	10
Four	4	10
Eight	24	60
<b>Total</b>	<b>40</b>	<b>100</b>

Table1. shows the number of communal containers provided at community level. The majority of the respondents representing 60% correctly indicated the exact number of eight communal containers had been provided for the community. The rest of the respondents were not sure of how many containers were provided and hence their responses were based on guess work.

5.2      **Impact of solid waste storage systems**

In order to ascertain how serious the problem of solid waste had become in Kaunda Square, respondents were asked to give their opinions on how much solid waste was found in some specific areas or points of the community. In order to achieve this, the following areas were used as study points: markets, streets, open places, school ground, shopping centre and government clinic.

Arising from the above, there are four terms that have been used to describe the volume of solid waste littering different points of the community. These terms are defined below in order to provide meaning to the reader.

**Very much:** describes the waste that has piled up into huge heaps or large volumes of waste.

**Some:** refers to waste scattered on the ground but not piled up into huge heaps or large volumes of waste.

**Very little:** refers to waste occurring in trace quantities on the ground.

**None:** refers to a situation where there is no waste at all.

**Table 2      Volume of waste found littering markets**

Responses	Frequency	Percentage (%)
None	0	0
Very little	0	0
Some	7	17.5
Very much	33	82.5
<b>Total</b>	<b>40</b>	<b>100</b>

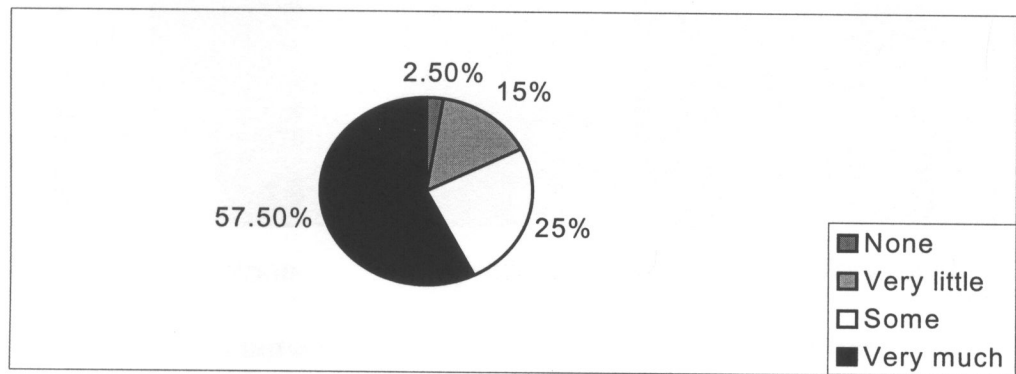
The majority of respondents confirmed that the market had more solid waste littering around, representing 82.5% response. Only 17.5% of respondents indicated that there was some solid waste littering the market.

**Table 3      Volume of waste found littering streets**

Responses	Frequency	Percentage (%)
None	0	0
Very little	8	20
Some	12	30
Very much	20	50
<b>Total</b>	<b>40</b>	<b>100</b>

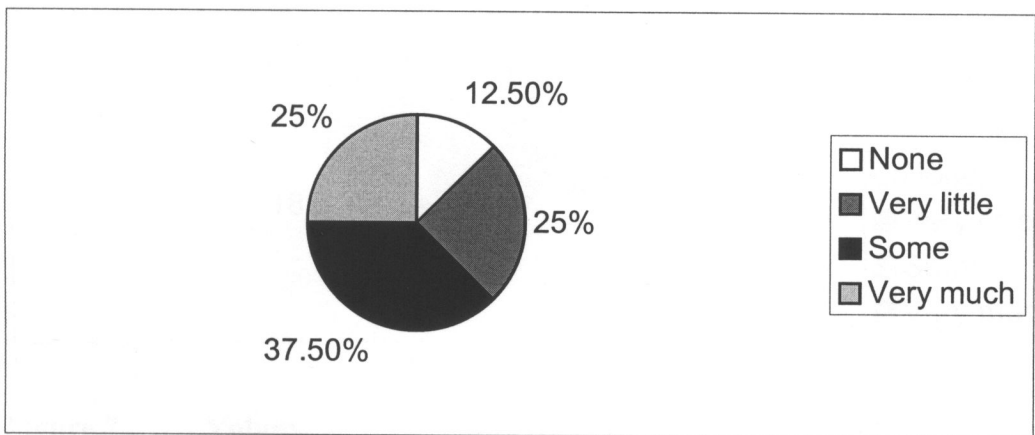
Half of the respondents representing 50% response reported that there were large volumes of solid waste found in the streets. 30% of respondents reported that

there was some solid waste littering the streets while the rest of the respondents observed that there was very little solid waste found in the streets.



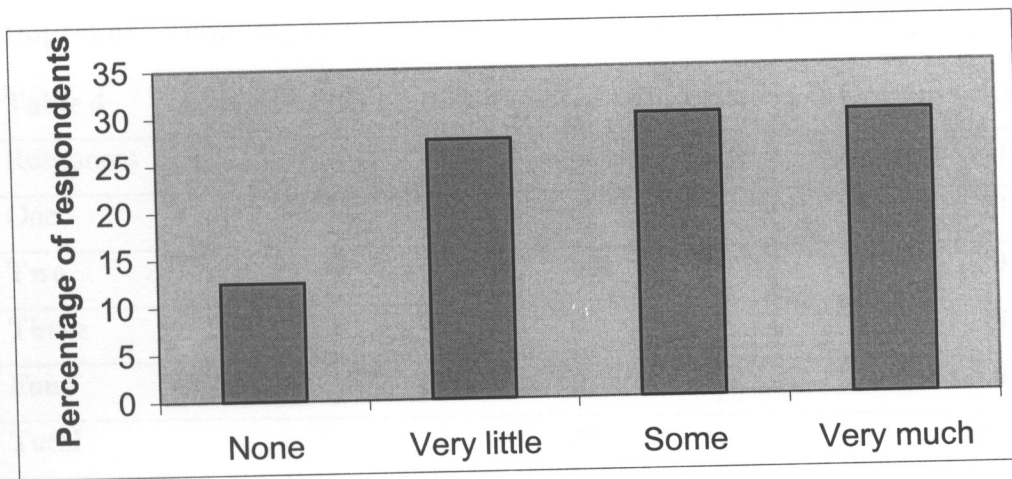
**Figure 4 Volume of waste found littering open places**

In Kaunda Square, there are some open places which were planned to be used as play parks for children but this has not been implemented. These open places had become solid waste dumping grounds. 57.5% of respondents confirmed that these open places had become dumping grounds with large volumes of solid waste. 25% of respondents reported having seen some solid waste littering open places. No respondent indicated the non-existence of solid waste in these open places.



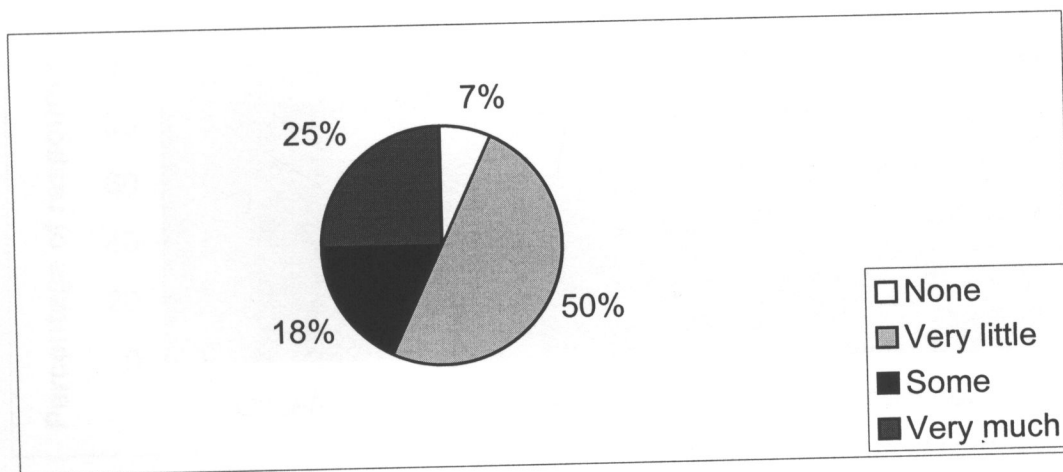
**Figure 5 Volume of waste found littering school grounds.**

37.5% of respondents confirmed having seen large volumes of refuse on school grounds. Those respondents who reported that none of solid waste was found littering the school constituted 12.5%.



**Figure 6** Volume of waste found littering shopping centres.

Figure 6 shows that the majority of respondents (representing 30%) admitted having seen large volumes of solid waste at shopping centers and 12.5% of respondents indicated not having seen any solid waste. Some of the respondents reported that there was very little solid waste while others indicated having seen some solid waste at shopping centres.



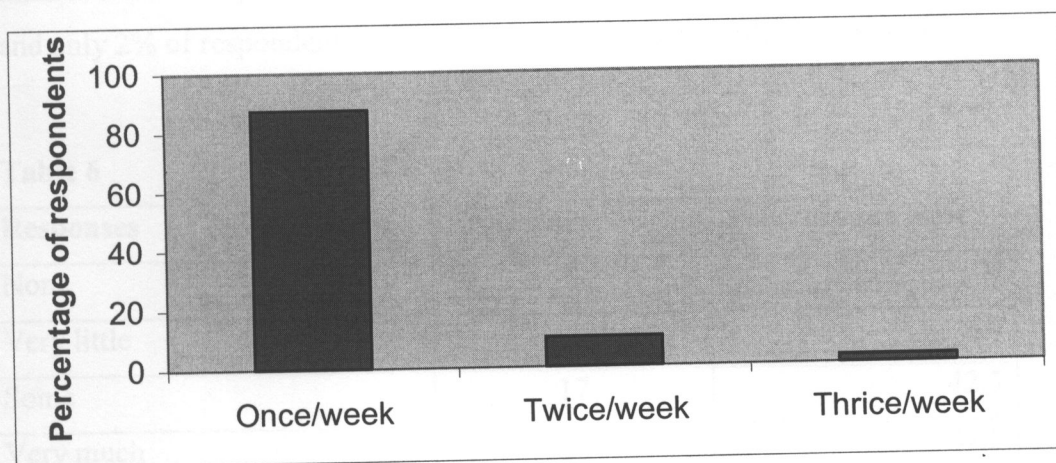
**Figure 7** Volume of waste found littering government clinic

Figure 7 shows that half of the respondents (50%) admitted having seen large volumes of solid waste at the clinic. 18% of respondents observed that there was very little solid waste littering the clinic while 25% of respondents reported having seen some solid waste.

**Table 4      Number of community based enterprises in the community**

Responses	Frequency	Percentage (%)
One	40	100
Two	0	0
Three	0	0
Four	0	0
Total	40	100

Table 4 highlights the number of Community Business Enterprises (CBE) in the community. All the respondents confirmed that there was only one CBE operating in the community, thus representing 100% response. This confirmation from respondents suggested that there was one firm dealing with collection, transportation and disposal of solid waste in Kaunda Square by name of G.L. Carriers (Z) Ltd



**Figure 8      Frequency of collection of refuse by the community Based Business Enterprise.**

Figure 8 shows the number of times in a week when communal containers are emptied and solid waste transported to the final disposal point. The information obtained from RDC indicated that G.L. Carriers (z) Ltd collected solid waste once per week. The majority of respondents representing 87.5% confirmed that the



firm collects solid waste once per week. The majority of the respondents were, however, not happy with this arrangement as they needed two or more days of collecting solid waste. The rest of the respondents were not sure of how many times refuse was collected in a week.

**Table 5            Present situation about waste littering markets.**

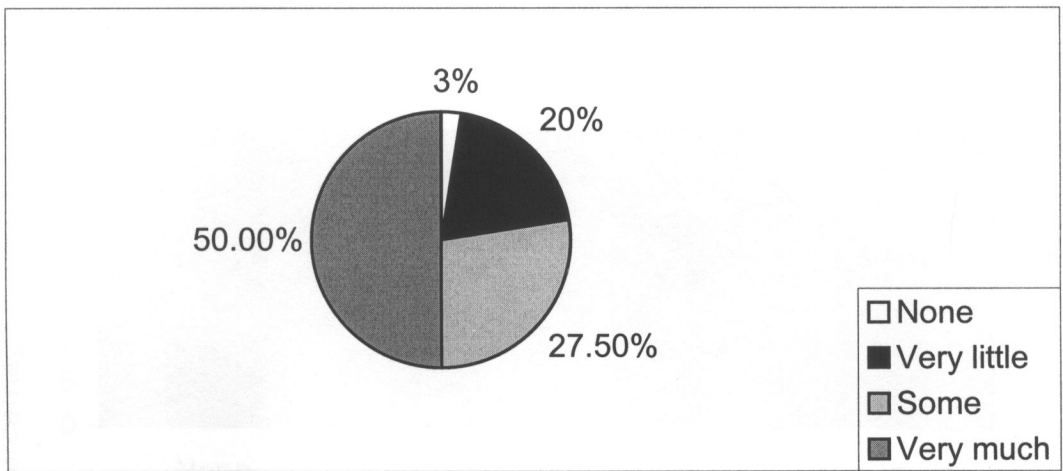
Responses	Frequency	Percentage (%)
None	0	0
Very little	2	5
Some	8	20
Very much	30	75
<b>Total</b>	<b>40</b>	<b>100</b>

Following the presence of G.L. Carriers (z) Ltd in the community, 75% of respondents observed that there were still large volumes of solid waste at the market. 20% of respondents indicated having seen some solid waste at the market and only 2% of respondents indicated having seen very little solid waste.

**Table 6            Present situation about waste littering streets.**

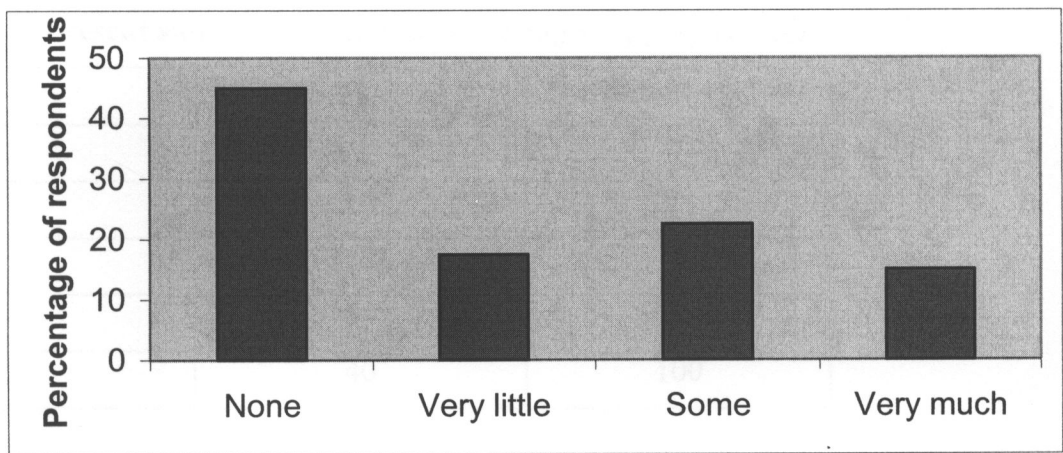
Responses	Frequency	Percentage (%)
None	0	0
Very little	4	10
Some	17	42.5
Very much	19	47.5
<b>Total</b>	<b>40</b>	<b>100</b>

Table 6 shows how much solid waste was presently littering the streets. The majority of respondents representing 47.5% reported that there was still large volumes of solid waste in streets.



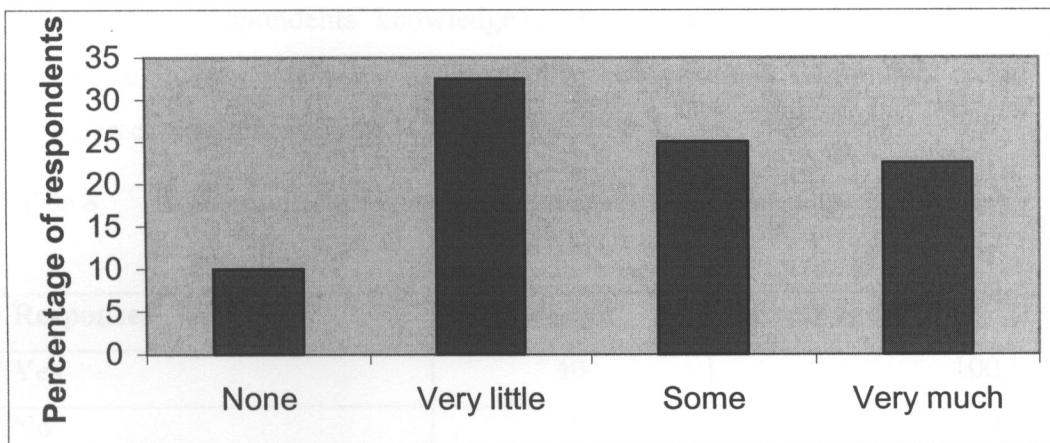
**Figure 9 Present situations about waste littering open places.**

50% of respondents confirmed having seen large volumes of solid waste in open places, whereas 27.5% reported having seen some solid waste in open places, 2.5% of respondents indicated having seen none.



**Figure 10 Present situation about waste littering government clinic grounds**

Figure 10 shows 45% of respondents confirmed that presently none of solid waste was found littering the clinic since the firm started operating in the area. 15% of respondents reported having seen large volumes of solid waste. This therefore, shows that there was improvement in solid waste management.



**Figure 11 Present situation about waste littering school grounds.**

Majority of respondents representing 32.5% indicated that very little solid waste was seen littering the school ground. 10% of respondents reported having seen none of solid waste at the school ground.

**Table 7 Present situation about waste littering shopping centres.**

Responses	Frequency	Percentage (%)
None	4	10
Very little	10	25
Some	12	30
Very Much	14	35
TOTAL	40	100

Table 7 shows that 35% of respondents reported having seen large volumes of solid waste at the shopping centres even with the presence of G.L. Carriers (Z) Ltd in the community. 30% of respondents indicated having seen some solid waste littering the shops. Some respondents reported having seen very little solid waste while other respondents indicated having seen no solid waste around the shopping centres, thus representing 20% and 10% of responses respectively.

#### 5.4 Community's knowledge and attitude towards disposal of solid waste

In determining respondents' knowledge and their attitude towards dumping of solid waste, it was necessary to probe whether indiscriminate dumping of refuse was a perceived problem.

**Table 8        Respondents view about whether litter poses danger in the community**

Responses	Frequency	Percentage (%)
Yes	40	100
No	0	0
<b>Total</b>	<b>40</b>	<b>100</b>

Table 8 shows that all respondents, (representing 100% response) admitted that litter posed danger to their community.

**Table 9        Dangers that litter can cause in the community**

Responses	Frequency	Percentage (%)
Induces diarrhoeal diseases such as cholera	20	50
Brings about flies	5	12.5
Provides visual nuisance	2	5
Induces offensive smells	3	7.5
Narrow the roads	10	25
<b>Total</b>	<b>40</b>	<b>100</b>

Table 9 shows some of the dangers respondents identified as being associated with litter. The majority of respondents representing 50% response confirmed that litter was a major cause of diarrhoeal diseases. 25% of respondents reported that the major reason why roads/streets had become narrower was due to dumping of litter along side the roads accompanied by blockage of drainage

systems which facilitate the flooding of roads during the rainy season. 12.5% of respondents further reported that litter attracted flies. Some respondents cited visual nuisance as being associated with litter, whereas the rest of respondents indicated that offensive smells was due to litter thrown carelessly.

**Table 10      Respondents view whether the problem of indiscriminate dumping of garbage is due to the level of understanding people have about solid waste.**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage (%)</b>
People have little knowledge about the hazards of dumping refuse anywhere	8	20
The fact that some people throw refuse anyhow and anywhere is evident enough of lack of knowledge	7	17.5
Negative attitude of some people Regardless of their education ignore the dangers of dumping refuse carelessly	10	25
The delay in picking up the full storage containers for emptying	10	25
Poor monitoring system by Lusaka City Council		
To some extent residents require awareness from the health department	5	12.5
<b>Total</b>	<b>40</b>	<b>100</b>

Table 10 highlights different views expressed by respondents as contributing factors to indiscriminate dumping of solid waste. Although the majority of respondents (60%) indicated that little knowledge contributed to indiscriminate disposal of solid waste significantly, other factors expressed in the table are equally worthy noting.

5.5 Community Participation in Solid Waste Management

In determining whether respondents had the potential to contribute effectively to solid waste management, it was imperative to probe about how much they could contribute and whether or not they were willing to participate and if so, to what extent.

**Table 11       Respondents view on whether they are consulted by RDC to participate at all levels in solid waste management.**

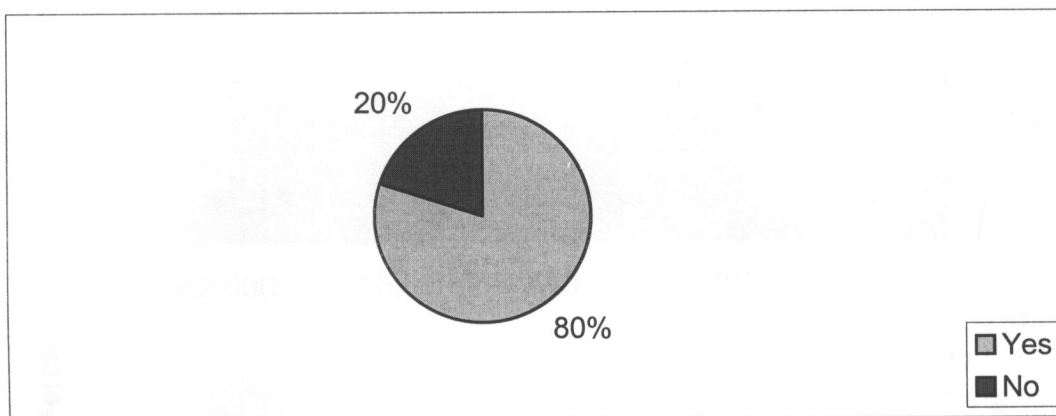
Responses	Frequency	Percentage (%)
Yes	0	0
No	40	100
<b>Total</b>	<b>40</b>	<b>100</b>

Table 11 shows an overwhelming response of 100% reporting that they were not consulted at all levels to participate in solid waste management.

**Table 12       Respondents view about the role a resident must play towards solid waste management**

Responses	Frequency	Percentage (%)
To educate one another on the dangers of indiscriminate dumping of refuse	16	40
To be watch dogs of our own township	3	7.5
To contribute financially or materially including labour if need be	10	25
Mobilise resources from well-wishers and invest in refuse collection	5	12.5
To develop culture of concern and belonging	6	15
<b>Total</b>	<b>40</b>	<b>100</b>

Table 12 shows the views expressed by respondents about what they were capable of contributing towards solid waste management.



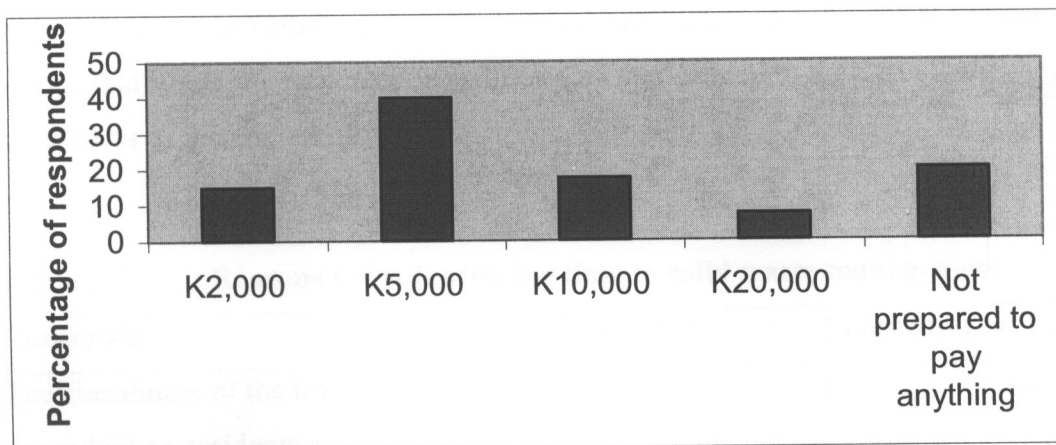
**Figure 12      Respondents view on whether to contribute part of income towards solid waste management.**

Figure 12 shows an overwhelming response with 80% of respondents reporting that they were ready to contribute either materially or financially, and only 20% of respondents refused to contribute part of their income.

**Table 13      Respondents view on the affordability of the cost currently charged by the local firm.**

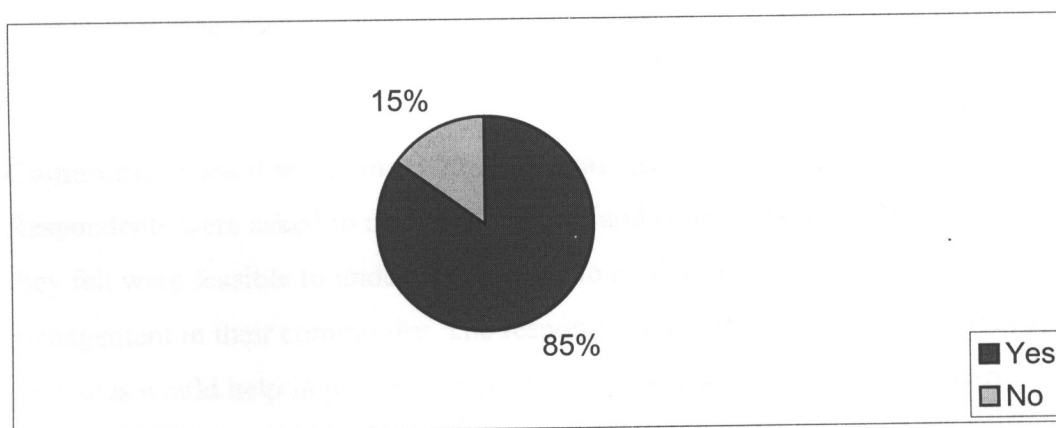
Responses	Frequency	Percentage (%)
Yes	27	67.5
No	13	32.5
<b>Total</b>	<b>40</b>	<b>100</b>

Table 13 shows 27 respondents representing 67.50% response were of the view that they could afford the cost of K5, 000.00 contribution towards solid waste. 32.50% of respondents indicated that they could not afford the cost.



**Figure 13** Part of income respondents are willing to contribute towards solid waste management.

Figure 13 shows the amounts of money respondents were willing to contribute towards solid waste management. The majority of respondents representing 40% response agreed to pay K5,000 every month. Some respondents representing 7.5% response indicated to pay K20,000 per month while 17.5% of respondents were ready to pay K10,000. 15% of respondents agreed to pay K2,000. 20% of respondents were not ready to pay anything.



**Figure 14** Respondents view on volunteering time in order to participate in solid waste management.

85% of respondents confirmed to participate effectively while 15% of respondents



were not willing to volunteer their time. Those not willing to volunteer their time argued that it was the responsibility of Lusaka City Council to maintain the cleanliness of the community.

**Table 14        Reasons for volunteering time to solid waste management**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage (%)</b>
The cleanliness of the township is dependent on residents and hence the reason to contribute time	5	12.5
To prevent out breaks of diarrhoeal diseases such as cholera	15	37.5
A clean environment is an indicator of healthful living	15	37.5
It is part of my contribution to Lusaka City Council and to the community as a whole	5	12.5
<b>Total</b>	<b>40</b>	<b>100</b>

Table 14 presents views expressed by respondents why it was necessary for them to volunteer time towards solid waste management.

**5.6        Community’s solid waste management strategies**

Respondents were asked to make suggestions and comments on the strategies that they felt were feasible to undertake in order to realize sound solid waste management in their community. The respondents felt that the under mentioned strategies would help in proper management of solid waste in Kaunda Square. However, the majority of respondents (35%) argued that the present eight (8) communal containers were not enough to cover fourteen (14) zones of Kaunda Square. Suggestions were made to increase the number of refuse containers to thirty-two (32).

**Table 15      Suggestions made by respondents on how to improve refuse collection**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage (%)</b>
To get involved in cleaning activities at least once a month by residents	8	20
Reinforce the law to arrest those found dumping garbage indiscriminately	3	7.5
Refuse to be collected at least three times a week	7	17.5
The council must not only depend on the private enterprise but do the work as well	2	5
The Neighbourhood Health Committee must incorporate council employees to enable decisions implemented quickly	2	5
The RDC must combine efforts with the Neighbourhood Health committee in the spirit to of serving the residents	3	7.5
The ward Councillor must not bring politics in solid waste management as this is retrogressive	1	2
The storage containers stalled for 14 Zones are not enough to cover Kaunda square stage I and II. Hence there is need to increase from 8 to 32 storage containers to cover 14 Zones adequately.	14	35
<b>Total</b>	<b>40</b>	<b>100</b>

Table 15 shows suggestions outlined by respondents on how best solid waste could be managed in the township. 35% of respondents suggested to increase the number of storage containers from eight (8) to thirty two (32) to cover fourteen (14) zones of the township. 17.50% suggested that the local firm should collect refuse at least three times a week. 20% of respondents proposed to get involved in cleanliness activities once a month. Other respondents made practical suggestions as outlined in Table 15.

## CHAPTER SIX

### DISCUSSION OF FINDINGS

This chapter discusses the issues raised in line with the objectives of the study. Issues being reiterated in different questions by respondents validated the trustworthiness of the information obtained.

#### 6.1 Solid Waste Storage system at household level

At household level, there are three main forms of solid waste storage systems identified in Kaunda square, namely, refuse pits, dustbins and open dumping (dumping indiscriminately). The polythene bags, although were not mentioned by respondents were also used as storage bags. However, few individuals have access to polythene bags. The bags are given to RDC by the local firm to distribute to the residents. However, the criteria used by RDC to supply polythene bags to residents was not clear and this was questioned by some respondents. The Chairman of RDC claimed that the polythene bags were given to residents on first come first serve basis for those who had paid the monthly refuse collection fee.

However, at household level the refuse pit is considered a final disposal system. When the pit is full, it is buried and the contents are left to rot. The difficulty expressed by respondents was lack of enough land space within the yards on which to dig refuse pits. The dustbins, on one hand, were owned by few individuals in the township. On the other hand, the rest of respondents were dumping the solid waste indiscriminately. The advantage of the refuse pit is that, it serves as a storage receptacle as well as the final disposal system. When the pit is full, it is buried and the contents are left to rot which can be used later as compost manure. However, when the bin is full, it is taken by any member of the household to the communal container for emptying.

## **6.2 Solid Waste storage system at community level**

At community level, the results show that there is only one storage system provided, the storage container. There are eight communal containers that have been provided by the local firm, GL Carriers (Z) Ltd. However, the community members were not fully sensitized on the provision of these solid waste containers and on which points of the township they were located. This is evident from the different responses provided by respondents. Some respondents were not even aware of the presence of the refuse containers in the township. This should serve as an eye opener to Kaunda Square Resident Development Committee and the Neighbourhood Health Committee to appreciate the need to work together in an integrated manner. The Neighbourhood Health Committee in conjunction with the RDC should provide Information, Education and Communication (IEC) to the residents on all aspects regarding solid waste management. Lack of coordination observed between residents, RDC and Neighbourhood Health Committee can be frustrating and likely to retard development in the township. This is against the principle of NEAP of 1992 that endorses the right of citizens to live in a clean and health environment by providing relevant IEC to communities.

The respondents argued that eight containers were not adequate for the township that consisted of fourteen (14) zones. The respondents were of the view that each zone should at least have two containers to adequately manage solid waste. Lack of adequate communal containers was cited as one of the contributing factors to indiscriminate disposal of solid waste. In my view it is not just the inadequacy of containers that contribute to dumping waste in open places. It is those residents that are not aware of the provision of containers at community level who merely dump their waste in open places and alongside the streets. This group of individuals contribute significantly to indiscriminate disposal of waste in the township.

## **6.3 Volume of waste littering the market and shopping centre**

Generally solid waste is one of the major problem in the township. The results show that there are two markets, one in each section of the township (Stages I and

II). Similarly, each section has a shopping centre. Although each market and shopping centre is provided with a communal container for refuse storage, the piling up of solid waste into huge heaps still remain unresolved. The communal containers get filled up at a faster rate. The continued generation of solid waste from the market and retail shops accompanied by prolonged period of collection facilitates the piling up refuse into huge heaps.

The type of refuse from the market and shopping centre include paper, food waste, sweepings, vegetables, plastics, empty tins, glass, putrescibles and wooden articles. However, the impact of the waste on the environment and human health cannot be over emphasized. The solid waste destroys the amenity of the township, produce odours which pollute air quality, produce offensive smells and attracts flies. The impact of solid waste on the environment is supported by Agyemang, et al. (1997) report. The report states that improper and inadequate garbage collection is known to generate dangerous gases such as methane and carbon dioxide through biological/chemical degradation processes, thereby causing explosives and fire.

In view of the above, the local firm need to scale up its effort in solid waste collection. At present the situation of solid waste dumping has not changed much because collection of waste is only done once per week and by the time the next collection is done, waste would have piled up into huge heaps.

#### **6.4 Volume of waste littering open places and streets**

It is a common feature to see streets that are narrowed by piles of solid waste. The open places and streets are known to be dumping grounds for domestic waste generated by households. Majority of respondents admitted dumping domestic waste alongside the streets and in open places. The type of waste generated from homes include food waste, garden waste, sweepings, papers etc. The rotting garbage produces visual pollution and offensive adours and many other effects which are detrimental to the environment and the health of human beings.

However, the presence of the local firm, G.L Carriers (Z), has however reduced the volume of waste in some areas of township such as the market, shopping centre and the clinic. Most respondents were of the view that collection of solid waste once per week was not adequate. The respondents' suggestion that regular collection of waste of at least twice per week may change the present picture. However, increasing the frequency of collection will translate into incurring more operational costs by the private sector provider. Unless residents are prepared to pay higher amounts than they are paying now, it will be difficult for the Company to adjust the frequency of collection. On the other hand, the amount of K5, 000 paid monthly is not adequate to cover the operational costs considering the fact that not everyone is paying. In addition to this measure, an increase of refuse containers would be more ideal. In support of this view, Flintoff (1976) highlights his findings and says "The rate at which flies breed in warm climates and mainly vegetable refuse of the Third World cities means that collections have to be made more often, usually daily or three times a week."

#### **6.5 Volume of waste littering the clinic and school grounds**

The results show that the school was the only study point that produced less waste on its ground. This is because of the cleaning up exercise that is done in the morning by pupils. However, in the afternoon solid waste resurfaces at a faster rate due to rapid generation. The clinic on the other hand produced solid waste of medical nature. The type of waste that is generated includes bandages, cartons, papers, disposable cards, empty bottles etc.

A report from the clinic official indicated that the institution did not have an incinerator in which to burn the waste. The objective of burning is to prevent children from scavenging considering the fact that most of the waste is of medical nature. However, Agyemang, et al. (1997) report indicates that where incineration is undertaken, such as in private homes, choking smoke and offensive smells are another source of pollution. In my view, open incineration is likely to cause respiratory infections among the clients at the clinic and those people living around the clinic. Most respondents reported that very little solid waste was now

seen at the clinic. The workers at the clinic dispose of their solid waste into communal containers to which children has little access. However, waste such as pathological waste, infectious waste and laboratory cultures are burnt by open incineration under the supervision of a health worker. This has created sightly conditions at the health centre. It has been observed, however, that incineration still remains unavoidable method of disposal as the clinic produces some special waste which requires burning such as post-natal waste.

## 6.6 **Dangers of litter in the community**

The results show that residents are knowledgeable about some dangers that uncollected solid waste is likely to cause in the township. Half of the respondents identified diarrhoeal diseases such as cholera and dysentery as infections associated with uncollected solid waste. The respondents were also aware that flies, visual nuisance and offensive odours were caused by indiscriminate dumping of solid waste. A good proportion of respondents (10%) attributed narrowing of streets and roads including blockage drainage systems to indiscriminate disposal of refuse.

In agreement with respondents' view, Flintoff (1976) discloses that storm water will not be managed without adequate solid waste disposal and cites domestic refuse as the most common cause of blockage of urban drainage. The flooding of roads due to blockage drainage makes the roads impassable. This scenario makes the management of solid waste more difficult in the rainy season than the rest of the year. It is during the rainy season that the township experiences diarrhoeal diseases such as dysentery and occasionally cholera.

Tchobanoglous, et al. (1977) give an overview of how dangerous uncollected solid waste can impact on society. The authors recall that in the 14<sup>th</sup> Century many Europeans died as result of an outbreak of plague. Investigations leading to the epidemic of plague revealed that there was an increased population of rats that bred in uncollected solid waste (Tchobanoglaus, et al., 1977).

#### 6.7 Respondents' views on whether they are consulted by the RDC for them to participate in solid waste management .

The results show that residents are fully not consulted by the RDC when it comes to issues related to management of refuse in the township. All respondents representing 100% response refuted having been consulted to participate in solid waste management. The respondents agreed very strongly that RDC and Lusaka City Council make decisions that are imposed on residents for implementation. The respondents cited one example where RDC and G.L Carriers (Z) Ltd came up with K5, 000 collection fee which was imposed on the community. The residents were not involved in deciding which amount should be agreed upon to enable the average man also afford to pay. In my view, respondents' views are right. Therefore, Kaunda Square Residents Development Committee works and achievements will not be appreciated unless residents are motivated. When meetings are held with residents, the RDC can benefit greatly because issues like engaging the private sector; the benefits expected from the entry of the private sector; the level and standard of service expected and consumer protection issues should be agreed at the outset of discussions. The arrangement will enable residents to have ownership over community projects and programmes. In addition, focus group discussions and interviews are also important avenues of getting opinions from the public. Thus, the views of the residents require serious attention and unless issues of partnership with the community are upheld, problems of solid waste will continue. Harpham, et al. (1988) emphasizes the significance of participation by citing a research that was conducted in Kebele town, Addis Ababa. The case of Kebele township reveals that an effective solid waste management depends on the cooperation between the community and service delivery agencies, whether private or government. The authors observe that poor urban communities have been known to make remarkable efforts, even sweeping their own streets, if they know that a vehicle will arrive at the agreed time to collect waste.



## **6.8 Role of residents towards solid waste management**

The information provided by respondents show that there are different roles that each individual in the community can play in managing solid waste. Majority of respondents suggested that they would join Neighbourhood Health Committee and carry out the functions of educating their fellow residents on the dangers of indiscriminate disposal of solid waste. In my view, this is an excellent indicator of the community's willingness to partner with other stakeholders in maintaining the cleanliness of the township.

Some respondents with good education background mentioned they had the potential of mobilizing resources from the well-wishers that can be invested in refuse collection. This kind of thinking by some residents creates an opportunity for RDC and LCC to harness the potential of individuals by incorporating them in decision-making process. The approach of using the local expertise (residents) working hand in hand with the private business firms can lead to the development of adequate infrastructure that will ultimately improve and extend efficient services to benefit all residents in the township.

## **6.9 Affordability of the cost currently offered by the refuse collector**

The results show that the majority of respondents are willing to pay the current collection fee of K5, 000. This therefore demonstrates that the cost of service provided by G.L Carriers (Z) Ltd is also affordable to the average person. This is attributed to the fact that the majority of residents are one way or the other involved in income generating ventures such as in retail trading, charcoal burning, street vending etc. Three quarters of the residents are living in rented houses and the rest are living in their own houses with one or two rooms that are rented out. This perhaps gives the justification as to why an average person in the township is able to contribute. This does not mean on the other hand, that everyone is agreeable to pay the current collection fee. The minority of respondents indicated they could not afford, and if they could, it was not their jurisdiction to clean up the township since they were subjected to pay rates and other taxes.

#### 6.10 **Community's suggested strategies to improve the collection of waste**

The results show a number of suggestions that respondents provided aimed at improving the existing collection of garbage from the township. These suggestions are a true reflection of the residents' willingness to participate actively in management of solid waste.

Respondents were of the view that residents in each zone must team up and identify one area such as the market or shopping centre which should be cleaned up once per month. In my view, the recognition of residents to volunteer their time to clean up any area identified to have huge heaps of refuse is a welcome attempt.

An increase in storage containers from the current eight (8) to thirty two (32) was a good suggestion. The realization is as a result of the fact that the present containers could not cope with the rate at which waste was generated. Furthermore, the present containers are too inadequate to cover the fourteen zones of the township. The need to have at least two containers in each zone is an ideal way of managing solid waste. The respondents further suggested that the local firm should be able to increase the number of days of refuse collection, from once per week to thrice per week. The respondents' argument is based on the fact that these containers get full earlier than expected and by the time the vehicle comes, heaps of refuse are already built up.

The issue of political interference is another area of concern. The respondents observed that the present relationship between the Ward Chairman and RDC Officials is retrogressive and likely to retard development in the township. It also alleged that the Ward Councillor bulldozes the functions of RDC. This causes tension between the RDC officials and those residents who are politically inclined to Ward Councillor's party.

## **CHAPTER SEVEN**

### **CONCLUSIONS AND RECOMMEDATIONS**

This chapter outlines the main conclusions and recommendations. The trustworthiness of issues reiterated on different factors influencing the indiscriminate dumping of solid waste are validated in this chapter. The recommendations have incorporated suggested avenues of the solutions that are feasible and practical at both household and community level.

#### **7.1 Conclusions**

The results have shown that Lusaka City Council has no capacity to manage solid waste in Kaunda Square. From the broader perspective, it is estimated that only 10% of waste is collected leaving out of 90% of waste uncollected. However, it should be noted that the 10% of waste collected does not cover peri-urban settlements. It covers the waste from the city centre, hotels, Fairview and few other places in the city. As a consequence, Kaunda Square remains one of the main contributors of waste generation in the city. The rapid rate of increase in waste generation is derived from high population growth. This has led to the involvement of the private sector in the provision of infrastructure. The most common types of solid waste generation are domestic waste, trade and commercial waste including institutional waste. Despite the presence of the private sector provider, the residents feel that there isn't much improvement in the collection of waste. However, this weakness is attributed to the service provider's weak financial investment in refuse collection thereby failing to provide adequate refuse receptacles.

The common storage facilities available at household level are dust bins, refuse pits and dumping of waste in open places. The results have shown that few people have the dust bins, and therefore disposing of waste in refuse pits or dumping indiscriminately is the most common practice. However, refuse pit construction is restricted by the availability of land space. Most plots have small land space making the construction of refuse pits impracticable. The residents

have knowledge about the importance of disposing of solid waste in a hygienic and judicious manner. They are also aware of the problems associated with waste littering the place. However, the residents need to be motivated and have the sense of belonging. This can be achieved if individuals participated in the management of their local area's development processes. On the contrary, the results indicate that there is limited participation. This phenomenon has been cited as one of the obstacles to effective management of waste. Nevertheless, the community organization like RDC should exploit any opportunity that comes their way. One such opportunity is the willingness of the residents to participate effectively and their willingness to get involved in the collection of waste.

The results show that in order to develop community self reliance, the starting point should be assessment of the community's perception about the surrounding waste. If however, the community does not recognize and consider the importance of collection and disposal, then it is likely that an external force might not be appreciated, and therefore there will be no maintenance and sustainability of the improvement.

Identification of the weaknesses and strengths or opportunities are critical in management of solid waste. One such opportunity the results have shown is the willingness residents have demonstrated to pay for service rendered by the local firm. The people have the capacity to pay for waste removal service. The residents have demonstrated that if they are provided with polythene bags which they are willing to buy, they themselves can empty them at communal containers in addition to the payment of collection fee. There is also lack of mechanism of fund collection by RDC. A proper design for collecting fees from the population is needed similar to that of TV collection fees. If more fees were collected, it would mean more improved service by the private sector provider. At the moment the results suggest that not everyone is paying towards waste collection despite the residents' willingness. The majority of residents have recognized that paying more for the service is a major personal contribution towards improvement of hygienic standards in the township. It is also crucial, on the other hand, that

service providers maintain the relationship with end users in such ways as to keep residents satisfied. This strategy can ease the legacy of tension and suspicion that is usually observed between disadvantaged communities and service providers. However, the perception of communities is that service providers do poor work.

## **7.2 Recommendations**

Arising from the study, the following recommendations were made:

- 7.2.1 The RDC should negotiate with the current refuse collector to stretch or increase storage receptacles at household level. The present storage systems are not adequate, hence there is need to provide polythene bags which residents can pay for. In the interim other options of storage can be employed at household level such as use of plastic bags, empty mealie meal bags and any other receptacle that a household can afford.
- 7.2.2. At community level, the communal storage containers are also not adequate. The township is divided into fourteen (14) zones and each zone requires at least two communal containers. This measure will drastically improve the solid waste problem currently being experienced by residents. In addition to communal containers, the refuse collector should provide skips at markets, retail trading premises, clinic and at school. The skips are intended to compliment the communal storage containers, which later can be emptied by the collection vehicles.
- 7.2.3 The refuse collector should increase the fleet of vehicles so that the frequency of waste collection is increased from once per week to twice per week. This measure will prevent the unnecessary accumulation or piling up of solid waste. Correspondingly an upward adjustment of collection fee should be effected and ensure that payment is mandatory.
- 7.2.4 Stakeholder participation at all levels of waste management should be encouraged. This will enable residents develop consumer confidence in service

delivery and ultimately create good climate for expansion of services. On the basis of this, RDC must ensure that Integrated Solid Waste Management (ISWM) become a priority on their agenda. This measure will incorporate views of the silent majority (residents) to make decisions in the management of solid waste.

- 7.2.5 The RDC and Neighbourhood Health Committee through their public awareness campaigns should continue sensitizing the community on the dangers of dumping solid waste into drainage manholes. Dumping of waste in drainage manholes blocks drainage system thereby causing flooding during the rainy season. When uncollected waste is flooded in the rains the consequences are many, one of them is the threat to outbreak of diseases.
- 7.2.6 The Environmental Council of Zambia and Lusaka City Council through Directorate of Public Health should continue to play a role of giving guidance and direction to Kaunda Square RDC on issues pertaining to management of waste. The role of these two institutions is to identify deficiencies in the collection delivery system and disposal thereby advising on how best they can improve the system performance either through Public or Private Operation.
- 7.2.7 One way of minimizing waste at household level is through reusing and separating the actual waste from non-waste. This can be done by avoiding collecting stones, soil and garden waste. The garden waste can be used as compost manure while soil and stones can be retained in the environment. This measure will reduce the heaps of refuse drastically.

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APPENDIX

QUESTIONNAIRE

INSTRUCTIONS

- Do not write any name or address on this questionnaire
- Tick or circle the correct answer where they are provided
- Introduce yourself indicating:
  - where you are coming from
  - the organisation you present
  - the purpose of the study
- Assure the respondents of confidentiality
- Explain solid waste management in introductory remarks

Survey Identification

- Name of Province .....
- Name of District .....
- Name of Township/compound .....
- Location .....
- Date .....

SECTION A : BACKGROUND INFORMATION

1.

Sex

:

a.

Male

(

)

b.

Female

(

)
2.

Age range:

a.

18-25

(

)

b.

26-30

(

)

c.

31-35

(

)

d.

36-40

(

)

e.

41 and above

(

)
3.

Level of education:

a.

Primary

(

)

b.

Secondary

(

)

c.

College

(

)

d.

University

(

)

e.

No formal education

(

)
4.

Marital Status:

a.

Married

(

)

b.

Widow

(

)

c.

Widower

(

)

d.

Single

(

)

e.

Divorced

(

)

f.

Separated

(

)
5.

Occupation:

.....



6. Average Income:
- a. Less than K100 000 ( )
  - b. K100,000 – K250,000 ( )
  - c. K251,000 – K400,000 ( )
  - d. K401,000 – K500,000 ( )
  - e. Above K500,000 ( )

**SECTION B: GENERAL INFORMATION**

7. What are the problems that affect your community? List them in order of priority.
- a. Poor water supply ( )
  - b. Indiscriminate dumping of refuse ( )
  - c. Bad road network ( )
  - d. High incidence of malaria ( )
  - e. High crime rate ( )
8. What is your understanding of “refuse”?
- .....
- .....
9. Do you consider refuse to be a problem in your community?
- a. Yes ( )
  - b. No ( )
10. If yes to question 9, tick the level of seriousness
- a. Very serious ( )
  - b. Serious ( )
  - c. Not serious ( )
  - d. I don’t know ( )
11. Is there any refuse collection in your community?
- a. Yes ( )
  - b. No ( )
  - c. I don’t know ( )
12. If yes to question 11, who collects the refuse
- a. Lusaka City Council ( )
  - b. Own home management ( )
  - c. Private company ( )
13. If No to question 11, what do you do with the refuse you produce at home?
- a. Dump indiscriminately ( )
  - b. Dump in refuse pit behind the house ( )
  - c. Dump in own dust bin ( )
14. In your opinion, which institution is responsible for collection of refuse in your community?
- a. Lusaka City Council ( )

- b. Private Enterprises ( )
- c. Donors ( )
- d. Community Organisations ( )
- e. Others, specify .....
- f. I don't know ( )

15. In your opinion do you think Lusaka City Council is doing enough in solid waste management, in particular, in your community?

- a. Yes ( )
- b. No ( )

16. Give a reason for your answer to question 15

.....  
 .....

17. In your own opinion, how much waste is found littering the soil in each of the following areas?

Area                      None                      Very Little                      Some                      Very

Much

- |                     |     |     |     |     |
|---------------------|-----|-----|-----|-----|
| a. Market           | ( ) | ( ) | ( ) | ( ) |
| b. Street           | ( ) | ( ) | ( ) | ( ) |
| c. Open places      | ( ) | ( ) | ( ) | ( ) |
| d. Schools          | ( ) | ( ) | ( ) | ( ) |
| e. Shopping Centres | ( ) | ( ) | ( ) | ( ) |
| f. Govt Clinic      | ( ) | ( ) | ( ) | ( ) |

18. What do you think is the present situation in each of the areas mentioned

Area                      None                      Very Little                      Some                      Very

Much

- |                     |     |     |     |     |
|---------------------|-----|-----|-----|-----|
| a. Market           | ( ) | ( ) | ( ) | ( ) |
| b. Street           | ( ) | ( ) | ( ) | ( ) |
| c. Open places      | ( ) | ( ) | ( ) | ( ) |
| d. Schools          | ( ) | ( ) | ( ) | ( ) |
| e. Shopping Centres | ( ) | ( ) | ( ) | ( ) |
| f. Govt Clinic      | ( ) | ( ) | ( ) | ( ) |

19. Is there any dump site in your community?

- a. Yes ( )
- b. No ( )

20. If Yes, how many dump sites are there in your community

- a. One ( )
- b. Two ( )
- c. Three ( )
- d. Four ( )

21. Do you have private enterprises dealing with collection of refuse in your community?
- a. Yes ( )
- b. No ( )
22. If Yes to question 21, how many community based business enterprises operate in your community?
- a. One ( )
- b. Two ( )
- c. Three ( )
- d. Four ( )
23. List the names of the community based business enterprises that are operating in your community?
- .....
- .....
- .....
- .....
24. What is the cost of service provided by the community based business enterprises to collect refuse from your homes per month
- .....
25. Is the cost of service you have mentioned in question 23 affordable?
- a. Yes ( )
- b. No ( )
26. If No to question 24, how much are willing to pay per month
- .....
27. If Yes to question 24, how many times is refuse collected by the community based business enterprises?
- a. One day per week ( )
- b. 2 days per week ( )
- c. 3 days per week ( )
28. Do you have Resident Development Committee (RDC) in your community?
- a. Yes ( )
- b. No ( )
29. If Yes to question 28, what activities does the RDC carry out in your community? (List them)
- .....
- .....
- .....



**SECTION D: ASSESSMENT OF INDIVIDUAL'S POTENTIAL TO PARTICIPATE IN SOLID WASTE MANAGEMENT**

36. Do you think you are given chance by RDC in decision making and subsequent participation at all levels in solid waste management?  
a. Yes ( )  
b. No ( )
37. If you were requested to contribute part of your earnings towards solid waste management, would you agree?  
a. Yes ( )  
b. No ( )
38. If yes to question 37, how much would you like to contribute?  
.....
39. If No to question 37, state the reason for your answer  
.....
40. If asked to volunteer your time to participate in solid waste management, would you agree?  
a. Yes ( )  
b. No ( )
41. Give a reason for your answer in question 40  
.....  
.....
42. Is there any community based organisation involved in solid waste management in your community?  
a. Yes ( )  
b. No ( )
43. If Yes to question 42, what is the name of the organisation?  
.....  
.....
44. What suggestions would you give to improve the removal of garbage from your community?  
.....  
.....  
.....

***THANK YOU FOR YOUR COOPERATION***