

# **SOLID WASTE MANAGEMENT IN LUSAKA'S SOWETO MARKET**

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## **DEDICATION**

I dedicate this report to my Dad, Mr. B. F. Kapulu and Mum, Mrs. L. E. Kapulu, whose love and support towards me keeps me going. My love Chola Mulenga whose love and care I cannot explain.

DECLARATION

"I.....KAPULU.....NDASHE..... Declare that this report has been composed and compiled by me and I have done the work recorded, that the sources of all materials referred to have been specifically acknowledged, and that the project report has not been accepted in any previous application for academic award."

Signature .......... Date .....29/10/2004.....

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## ABSTRACT

Solid waste management is very important if we are to preserve the environment in which we live or carry out our daily activities. For sustainable development to be effective a compromise has to be reached between the affected and the infected, in this case the environment. But for this to be effectively achieved community participation should be encouraged in keeping the environment clean. To do this effectively, knowledge of what value the environment has is inevitable. And so how well the people are informed will determine the results obtained at the end of the day.

The quality of waste management depends on the resources; for example, human, financial, and material; time allocated for carrying out the task; and the efficiency of the resource use. The point to which the situation is left to degenerate is not just a matter of technique and money. It also depends how the community considers the issue of solid waste to be a problem. If waste management is not viewed as a major issue in the community, especially during economic hardships there is likely to be no driving force for maintaining management standards and even less for improving them.

The perception and attitude of the community towards the issue of waste management must first be assessed before putting in place a waste management plan that will be sustainable. The community must conceptualize the relationship between waste and its undesirable effects if it is not collected and disposed properly. This can be measured by determining the degree of knowledge the community has on a series of specific aspects of the relationship. Such aspects can be for example the definition people give to waste, the knowledge that uncollected waste represents a hazard, the identification of links between the presence of waste in the environment and major hazards.

The level of awareness of the actual situation in an area can be translated by, the perception of individuals on the cleanliness of an area or city, the knowledge and perception of the service offered in waste collection and disposal. These facets can be used to establish the scope of the study and the direction a particular research will take.

The same has been done in the case of Soweto Market by looking at the ability of respondents to define waste, prioritize waste as a problem, and also be able to come up with suggestions centering on encouraging community participation in solid waste management.

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## **ABBREVAITIONS AND ACRONYMS**

CBO	Community Based Organizations
CSO	Central Statistical Office
ECZ	Environmental Council of Zambia
EPPCA	Environmental Protection And Pollution Control Act
LCC	Lusaka City Council
MENR	Ministry of Environment and Natural Resources
NEAP	National Environmental Action Plan
NEC	National Environmental Plan
NGO	Non Governmental Organization
PUSH	Project Urban Self Help
UK	United Kingdom
USA	United States of America
WFP	World Food Programme

## CHAPTER ONE

### INTRODUCTION

#### 1.1 GENERAL OVERVIEW

The environment has a natural ability to breakdown biological waste and put them in the ecosystem. Many waste products are food for some creatures, or are broken down by sunlight, water or other chemicals, that occur naturally in the environment. This is part of the cycle of life that has evolved since the origin of life on earth. Plants absorb carbon dioxide to produce food, and give off oxygen to the air as a waste. People and animals breathe air and absorb oxygen as a fuel for life's processes, breathing out carbon dioxide as a waste.

Natural ecosystems have limits as to the amount of waste they can process beyond which the system breaks down, with potentially disastrous environmental consequences. Pollution can decrease the productivity of ecosystems as well as impose serious impacts on human health.

Systematic monitoring of environmental quality is lacking above a very basic level of just even testing of drinking water. But this is largely ad hoc. A survey of industrialised areas of Botswana in 1991 and Zimbabwe in 1992, revealed that many did not know whether the waste they produced was toxic, or what was in the waste (The World Conservation Union 1994).

Man in his quest to better his livelihood, has ventured into technological advancements in the last 100 years and is processing and producing consumables and non-consumables, most of which have by-products like plastics and other containers that are non-biodegradable. When these are disposed off after use, what results, are long-term effects on the soil that cannot be recovered in a lifetime, because most soils have ended up being destroyed. However several other forms of disposing off solid waste have been developed in more developed countries like Japan, where they recycle plastics and

process other forms of solid waste into products for resale to cut down on the problem of solid waste management expenses. But for the less developed Third World technologically, the price remains high in terms of solid waste management. Mostly no one is willing to pay the price for a clean and sustainable environment.

With the increasing world-wide concern about the environment (sustainable development, ozone depletion, destruction of tropical rain forests etc.) and the actual or potential effect that business, industry, and the private citizen have on the future of planet earth as we know it, there is pressure on organisations of all types to manage their impacts on the environment. Managing (for) the environment is a relatively new concept to many in business, industry, commerce, and local and central governments through out the world. Times are changing and so are attitudes, and the environment is also emerging as good and profitable business.

Many organizations, perhaps prompted by concerned bodies (e.g. financial institutions and pressure groups), wish to improve and demonstrate their environmental achievements and performance. Many also do so against the background of increasing awareness of environmental issues and pressure for improvement from customers, shareholders, employees and the public, as well as the increasingly demanding requirements of legislation (Hillary, 1997).

On the other hand liquid waste is easily removed from its generation point because it can flow through sewer systems to treatment sites. However, solid waste that is the most visible form of pollution requires a proper solid waste management. It must be properly arranged from the point of generation, storage, transformation, and disposal at a properly chosen site. In line with this, solid waste has been a problem to man; even the developed nation's still struggle to clean their environment from the massive amounts of waste that they generate.

Currently, the espoused solutions to waste are; waste minimization through the production of goods that give out less waste and the eventual recycling of that waste or most of it.

Suffice it to say, the chronic effects of untreated waste, which are usually wide spread are far more difficult to see, but generally they decrease resistance to disease and undermine health. The effects are largely unmonitored most especially in Zambia. The health problems related to drinking untreated water, eating contaminated food, resulting from untreated waste, indicate outbreaks of gut diseases such as cholera, and diarrhoea or poisoning.

The management of various types of waste has over the years been a very difficult and challenging issue in Zambia. This difficulty has manifested itself in the periodic outbreaks of diseases such as cholera, and in the pollution of water resources. Improvements are desired in waste management aspects covering the minimization of waste generation, collection, re-use, recycling, treatment and disposal of waste.

With regard to this, the Government of the Republic of Zambia (GRZ) enacted legislation to provide the control of these activities such as the Environmental Protection and Pollution Control Act (EPPCA) of 1990, amended in 1991. In 1993, the regulations for the licensing of transporters of waste and operators of disposal sites were signed. Additionally, Zambia is party to the Basel and Bamako convention on the control of transboundary movement of hazardous waste (ECZ, 2001).

While acknowledging the government's efforts, through various stakeholders towards solid waste management in residential areas and markets, the issues at hand could be the people's attitude towards collecting and disposal of waste, which might be a contributing factor to the endless dumping of garbage.

Low-density areas have overcome this problem through the payment of rates to the city council and sometimes fees to private companies for garbage collection and disposal.

The introduction of the Resident's Development Committees (RDCs) as the smallest organ of the local government to organise the community at local level, has done little to address the problem of solid waste in most of the residential areas. This is because they heavily rely on the council to remove the garbage. The situation is even worse at Soweto Market in Lusaka, where no proper organisational structures exist to address this problem.

However, despite all the efforts that have been made, one approach has not been taken and that is encouraging community participation in solid waste management and that is a vital role to be appreciated if the programmes put in place to avert or reduce the problem of solid waste are to succeed.

## **1.2 STATEMENT OF THE PROBLEM**

Solid waste management has been an area of investment by environmentalists world over. Various campaigns aimed at educating local communities, industries and other sources of waste disposal as a means of increasing their knowledge as regard solid waste management have been carried out using various methods and techniques.

One would suppose that a clean environment depends on the community's participation in keeping it clean, but this has not been easy for Lusaka's Soweto Market. Despite all the measures put in place, a continued presence of solid waste has been observed. Hence there is need to carry out a research to investigate the people's response to this effect.

## **1.3 AIM**

To investigate the causes of indiscriminate dumping of solid waste at Soweto Market.

## 1.4 OBJECTIVES

- 1.4.1 To assess the effect of community participation on solid waste management
- 1.4.2 To assess the effect of environmental knowledge people have on solid waste management
- 1.4.3 To investigate the type of sanitary storage systems present and their effect on solid waste management practices.

## 1.5 RESEARCH QUESTIONS

- 1.5.1 What impact does community participation have on solid waste management?
- 1.5.2 Does environmental education affect people's response to solid waste management?
- 1.5.3 What effect does the lack of sanitary storage systems have on solid waste management practices?

## 1.6 RATIONALE

The issue of solid waste management has been tackled by researchers before in residential areas and markets as one of the many objectives in their research. It has never been critically looked as a single topic, whose solution would lead to solving other problems like perennial diseases like cholera and diarrhoea, with the community taking an upper hand.

High-density areas like Soweto Market are epi-centres of contagious diseases that spread to other areas that are sanitarily maintained. The people in these areas are seemingly comfortable with living in poor conditions, and these might be significantly contributing to the unmindful discarding of litter in the city.

It is for this reason that special interest was taken in choosing Soweto Market, so that solving the waste management problem would reduce or help control contagious diseases occurring year after year from such places which are visited often by people from different parts of the city as well as commuters.

The study will help policy makers and other stakeholders address the issue of solid waste in Soweto Market once and for all, and in turn provide alternative solution of how within the current institutional framework they will contain the situation. This might help prevent seasonal out breaks of cholera that subsequently lead to the closure of the market by health workers. The study will also help evaluate some of the programmes that have been carried out in the area previously, and see what impact they have had on the environment and the local community.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

Pollution is perhaps the best publicized or published of various threats to ecosystems and natural communities, but the subject is so broad and objectives so great that there has been little common ground for discussion, even among conservationists.

Firstly, uncritical appeals for “an end to pollution” are of limited value. Granted all pollution is bad, some kinds of pollution are worse and therefore must be established (Eherenfeld, 1972). In this case estimates of the relative effectiveness of methods of stopping the pollution versus methods of treating it are the facts.

This chapter aims at looking at the various facts of solid waste management trends and practices from the eyes of various stakeholders around the world.

#### **2.1 Background**

The great increase in immigration to urban areas after independence led to an enormous demand for housing. The response by the government was to build more low cost houses in Chilenge, Kabwata, and Chelston. However, this proved inadequate and efforts were made with various self-help housing schemes by creating site and services schemes. This included Mandevu, Mtendere, Kaunda Square, Marapodi, and Chunga. These official schemes could satisfy only a fraction of the demand such that at the same time there was an enormous growth of squatter settlements. This has led to Lusaka becoming the fastest growing city in the country (at a rate of 6.2% annually compared to the natural population growth rate of 3.2%; LCC, 1997, Solid Waste Management Master Plan – Lusaka). It encompasses the largest urban area in Zambia with 1.1 million people (CSO, Lusaka, 1990). Table 2.1 evaluates Lusaka for type of population density.

**Table 2.1: Evaluation of Lusaka for type of density area.**

Type of density area	Census – 1990	Estimated growth	Projected growth	Percentage of pop.
High Density	552 018	7.05%	827511	74.9%
Medium Density	140 400	4.7%	185151	16.8%
Low Density	76 925	2.9%	91398	8.3%
<b>Total</b>	<b>769 343</b>	<b>6.2%</b>	<b>1104060</b>	<b>100.0%</b>

**Source: LCC, 1997, Solid Waste Management Master Plan – Lusaka**

The rapidly increasing quantities of waste generated due to industrialisation and population growth during the last few decades has become a major concern for Zambia’s environment. The annual average rate of increase of this waste in Lusaka alone is increasing and is expected to grow from 220,000 tonnes (1996) to 530,000 tonnes in 2011, an increase of 141% (State of Environment in Zambia, 2000). State of Environment in Zambia 2000, reports that this increasing growth has made it impossible for the municipal authorities to fulfil their obligations concerning solid waste management due to disposal at designated sites. The remaining uncollected waste has become a major concern for the responsible authorities as this has caused several outbreaks of cholera and other diseases and a general deterioration of the environment especially in peri-urban areas and the adjoining high-density compounds (ECZ, 2000).

**2.2 Solid Waste Management in High Density Areas**

Table 2.2 shows the description of the estimated solid waste generated in Lusaka per year in relation to the population density.

**Table 2.2: Estimated yearly quantities of Waste generated in Lusaka and its density (1996)**

Category of Waste	Estimated Quantities (tonnes/year)	Percentage of total quality	Density (Kg/M <sup>3</sup> )
<b><u>Domestic</u></b>			
High density	169 143	69.50%	395
Medium density	36 493	15.00%	309
Low density	13 678	5.60%	447
<b><u>Trade and Industry</u></b>			
Hotels	1392	0.60%	277
Markets	11783	4.80%	207
Industry, Commerce	5559	2.30%	51
<b><u>Others</u></b>			
Hospitals	52811	2.20%	Not analysed
<b>Total</b>	<b>243329</b>	<b>100%</b>	

**Source: ECZ, LCC and CIDA 1997: Solid Waste Management Plan project for the city of Lusaka, phase-1- Diagnosis report.**

According to table 2.2, the domestic waste in high-density areas accounts for almost 70% of the total waste in Lusaka. Quantities of solid waste generated from all the markets were estimated at a generation rate of 1.67kg / stall / day and the estimated annual solid waste generated from all the markets in Lusaka is 11,783 tonnes/year (LCC, 1997). The report further states that 45% of the total annual estimated solid waste generated from all markets in Lusaka comes from the town centre sector, which comprises Soweto Market, the largest market in Lusaka. The average density for the market waste is 207kg/m<sup>3</sup>, which is higher than the commercial waste due to a higher context of decayable material, and moisture content is lower than the domestic solid waste density due to a higher content of lighter fractions (LCC, 1997).

## **2.3 Solid Waste Management**

Ntengwe (1999), says that, solid waste management encompasses a wide range of individual activities which may be grouped into:

- a. Waste generation
- b. Onsite storage
- c. Collection
- d. Transfer and transport
- e. Processing and recovery
- f. Disposal

The combination of these activities is known as a solid waste management system, according to Ntengwe. Considering of these groups of activities according to Ntengwe (1999) will enable the public, politicians, decision makers and planners to recognise and understand more easily the important relationships that must be evaluated in the planning process.

### **2.3.1 Objectives and Strategies of Solid Waste Management**

The primary objectives of solid waste management as out-lined by Ntengwe (1999) are:

- a. Protection of human life
- b. Protection of natural resources (land, raw materials and energy)
- c. Protection of the environment (water, air, fauna and flora)

In order to achieve the above-mentioned objectives, Ntengwe suggested that the following measures should be undertaken.

- i. Training of waste managers
- ii. Control of litter
- iii. Provision and control of land fills to acceptable standards

- iv. Control of industrial wastes and their disposal
- v. Control of waste storage, collection and transportation to acceptable standards
- vi. Recycling of waste streams
- vii. Waste minimisation
- viii. Control of packaging.

Strategies that can be employed in order to ensure that the above-mentioned measures are delivered include:

- a. Regulatory strategy for management of wastes
- b. Planning process: includes collection of reliable data and preparation of waste management plans on a local basis. These plans should take into account International Corporation, which may be required for control of certain hazardous wastes and undertaking of solid wastes (Ntengwe, 1999).

### 2.3.2 Principles of Solid Waste Management

Ntengwe (1999) further outlines some principles of solid waste management, which should be undertaken in a manner that adequately protects human health and the environment consistent with the affordability for waste management, which should be incorporated.

- a. **Principles of preparation:** The basis of this principle is that environmental pollution must be minimised as far as possible and measures should be taken before damage occurs. Changes in input material used may reduce waste quantities, the hazardous nature of the waste, provide for easier recycling of the product at the end of its useful life. However, it is necessary to ensure that changes in input materials do not adversely affect product quality or result in higher or more hazardous waste generation at some point in the process.

- b. **Precautionary principle:** It is important to ensure that waste management practices as they develop do not have a serious legacy of pollution for the future. Therefore the provision of waste management is to be required in order to make decisions based on informed opinions on the least cost option, and for purposes of budgeting and the determination of user charges.
- c. **Polluter charges principles:** costs of preventing, eliminating, or compensating for damage to the environment must be borne by the party responsible. Cost recovery from waste producers is an objective to be achieved in order to implement this principle, which will motivate them to behave in an environmentally sound manner.
- d. **Cooperation principle:** Cooperation among all social groups is necessary in order to solve environmental problems. Steps that are taken to involve the community should be economically viable. This principle has in most cases failed as soon as donors withdraw funding.

## 2.4 Response to Solid Waste Management issues in Developed Countries

### 2.4.1 The United Kingdoms Approach to Sustainable Waste Management

December 1995 saw the launch of what may well have been the most significant environmental initiatives in the UK since the introduction in 1990 of the Environmental Protection Act. This was the publication of making waste work (the UK Government's strategy for sustainable waste management). The strategy was to be developed later in Scotland. The aim of the strategy was to improve the way waste was managed in the United Kingdom. For the first time it set targets for waste control, recovery and recycling. Launching the strategy, the Secretary of State for the Environment, the Right Honourable John Gummer MP, stressed that industry, business, local and Central Government, as well as the general public all have a key role to play by reducing, reusing

and recycling their waste. “The strategy aims to improve the way we manage waste”, he said, “Only by taking responsibility for the waste we produce can we ensure that our environment is protected both now and for future generations. We cannot entirely eliminate waste production – but we can reduce the impact that our waste has on our environment,” (Moller, 1997).

Moller, (1997) further outlines that on 1<sup>st</sup> April 1996 a new Environmental agency was introduced in England and Wales. This brought together the work of three existing bodies. The National River Authority; Her Majesty’s Inspectorate of pollution, and waste regulation bodies throughout the country. The Agency also has a statutory role in providing formal advice to the secretary of state about the context of the strategy and gathers data and information by way of National Surveys of waste facilities and annual waste arisings.

This has attracted a tremendous response from stakeholders and the community at large, in participating in solid waste management. It has subsequently seen the formation of institutions involved in technology, and information dissemination about solid waste. Further more waste management systems have been developed to help in the recovery, recycling, reuse, transportation and disposal of waste (Moller, 1997).

#### **2.4.2 The Viennese approach of separate plastics collection**

In the wake of the Austrian packaging ordinance, which came into force in 1993, (Moller, 1997) the municipal authorities of Vienna finally had to revise their original strategy of separating, recovering, and recycling only recyclable materials.

Moller (1997), further reports that municipal solid waste is primarily composed of vegetables, paper, glass, metals, and plastics. These are the main constituent fractions into which the residual waste stream can be reduced by waste separation.

For this reason and particularly because existing facilities for paper and glass production also turned out to be suitable for recovery, glass was first separated in Vienna in 1979 and by 1997 paper was also being collected separately. These operations served as pilot projects for other waste fractions that were to follow in the forthcoming years.

### **Vienna's Waste Management System**

Over the past few years as noted by Moller (1997), Vienna has progressively recycled more of its waste and there were plans to cease direct land filling of household waste during 1996.

Moller observes that Vienna has approximately 1.65 million inhabitants each producing around 500kg of Municipal solid waste each year. With the exception of 1994, when for the first time a small decline in overall tonnage was recorded, more waste has been generated each year, 515,000 tonnes were generated in 1978, (Moller, 1997).

At the same time a greater proportion of these wastes generated have been used productively through reclamation as materials, energy and compost and the amount of landfill has declined.

Moller further recognised that in 1994, of the 806,000 tonnes of waste handled by Magistrate's Department, 37% was recycled, 53% subject to energy recovery and only 10% sent to land fill. The total cost for collection and disposal amounted to some five hundred and thirteen million Deutschmarks.

### **2.4.3 Solid Waste Management in USA**

In the United States, it is said that by the year 2000, the USA could easily recycle and reuse 35% of the municipal solid waste resources it now throws away (Miller, 1988). One of the ways it could use to accomplish this as suggested by Miller (1988), is through requiring consumers to sort household wastes for recycling or give them financial incentives for recycling. For example, trash separated for recycling can be picked up free while people who don't separate their waste are charged a fee per bag. The community

is encouraged to separate glass, plastic, metal and decayable waste and put these in different containers for collection. This is the participation by the community from the point of waste generation to help ease disposal methods. (Miller, 1988).

## **2.5 Response to Solid Waste Management issues in Zambia**

During the colonial days there was a difference between low and high density areas in terms of solid waste collection services, the situation did not change after independence, though efforts were made to provide services to all (LCC, 1997).

Until 1990 no single corpus of law existed in Zambia that could be described as a country's environmental legislation. Rather, there were a number of separate enactments made by different Ministries and Departments that dealt wholly or partially with various facets of the environment. For instance, the local Administration Act Cap 480 of the Laws of Zambia, through district councils has tried to introduce pollution standards (Bwalya Chifwalo, 1992). The Act of 1990 according to Chifwalo, provided for the creation of the National Environmental Council (NEC) as the umbrella body coordinating activities related to the environment. The act provides for the quality of water, air, the regulation and control of waste disposal etc.

The change of government in 1991 and in response to World Bank demands, that issue of development must be tied to environmental sustainability and in line with the United Nations Conference on Environment and Development resolution (Rio, 1992), the Environmental Council of Zambia was established. The Ministry of Environment and Natural Resources (MENR) was later created in 1994. The MENR is responsible for pollution control and Natural Resources conservation where as the Environmental Council of Zambia facilitates environmental quality control. It is responsible for the enforcement of the Environmental Protection and Pollution Control Act (EPPCA), of 1990, (NEAP, 1994). In 1994, the government came up with the National Environmental Action Plan in which issues of the 'Environment and Natural Resources degradation were tackled (NEAP, 1994).

### **2.5.1 Government's Policy on Solid Waste Management**

The National Environmental Action Plan (1994) recommended that the right of a citizen to a clean healthy environment be recognised and included in the constitution as a fundamental right for all Zambians. To uphold government's policy, there were a number of legal frameworks, and Acts of Parliament, which were passed. For example, the Environmental Protection and Pollution Control Act (EPPCA) of 1990, is considered to be the umbrella legislation for the environmental protection (NEAP, 1994). The Act provides for a legislative base, a system of standards and licensing and an autonomous parastatal policy advisory body.

The Environmental Council of Zambia (ECZ) has powers under section 48 of the Environmental Protection and Pollution Control Act No. 12 of 1990, to give specific or general directions to District Councils on their functions in relation to collection and disposal of waste operations (ECZ/LCC, 1997).

ECZ has issued a series of regulations relating to solid waste management. Among these, is that discharge of waste so as to cause pollution in the environment is forbidden, and that collected waste should be transported to a licensed site only (ECZ/LCC, 1997). However, most National Environmental strategies, and Action plans identify institutions weaknesses as a vital factor contributing to the perpetuation of environmental degradation.

### **2.5.2 Collection of Solid Waste in Lusaka**

The major collectors of solid waste are LCC. This is usually done in the low-density residential areas, the vicinity of Government buildings and in town centres. Collection

from medium density and peri-urban areas where there is no regular route for refuse collection is only done when the refuse tipper trucks with front-end loaders are available.

In 1996, the total quantity of domestic solid waste came from the high-density areas. Garden- Chaisa compound, with a generation rate of 0.56kg person / day generates 41,316 tons/year, is second only to Kanyama, which produces 42,314 ton/year, (ECZ, LCC, 1997). Of the entire domestic solid waste generated in Lusaka only 12.4% is effectively collected by Lusaka City Council. The amount rises to 14.4% including private collection, (ECZ/LCC, 1997).

## **2.6 Community Participation in Solid Waste Management**

World Bank (1995) defines participation as a process through which stakeholder's influence and share control over the development initiatives, decisions, and resources that affect them. In the National Environmental strategies, (World Bank, 1995), it is reported that another means for building political support for environmental improvement is public participation in environmental management activities. It is said that this way, public involvement in environmental management can be sustained. For example, NGOs have focused on or been created to articulate community concerns about environmental problems. Consultations and town meetings have been used to discuss environmental priorities, constraints and opportunities. Another approach is direct through public protest, legal action, or grassroots management (World Bank, 1995).

In Lusaka, an attempt has been made by communities to remove refuse from their own communities. More and more industries rely on the private sector for refuse collection and transportation. A similar trend was started in peri-urban areas, which were hardest hit by the degeneration of the service by the city council. The population in these areas has poor economic resources and therefore cannot afford paying the city council for an acceptable waste collection service, (ECZ/LCC, 1997).

This service is sporadic (ECZ/LCC, 1997). The reason for this is the dependence on revenue mainly from rates and billing of services. This is supplemented by a grant from the Government, which has reduced significantly in subsequent years. This means that its financial resource is outstripped by its assumed responsibilities. This has resulted in their service being restricted to low density areas.

One notable organisation working with the High-density areas is the PUSH- Zambia. The project is implemented on the basis of staple food given for work accomplished, commonly known as 'food for work'. Until now, more than 2,000 people in Lusaka, mostly women have participated in the project, (ECZ/LCC, 1997). The programme promotes assistance projects in low-income communities and its funds, and technical assistance are provided by the World Food Programme (WFP) and other donor agencies.

While the programme ran, solid waste collection and disposal, roads repair and drainage digging were done effectively. As is the case with most donor driven programmes, the services came to a standstill when the phase came to an end in 1997, (ECZ/LCC, 1997).

## **2.7 Environmental Education in Waste Management**

The role of environmental education in raising awareness, improving understanding of issues and encouraging positive action is receiving greater attention in Southern Africa. Environment is included in most school curricula in one form or another and environmental magazines and other publications are produced for children and adults. Non-governmental organisations are directing more energy into this and some have been formed specifically to implement environmental education. The media are becoming better informed, and more stories on environmental issues are appearing in print, on radio and television, (The Conservation Union, 1994).

To add on, contagious diseases such as diarrhoea, cholera, and other water-borne diseases such as bilhazia are found in water contaminated with untreated human waste and sewage. The overall impact of pollution on environmental and human health in Southern

Africa is difficult to judge because there is no baseline information. No long-term study of pollutants has been undertaken at regional level and appropriate control mechanisms are not in place or are poorly enforced. In some cases, pollution is not monitored; however, a review of the individual sources of pollution and their known impacts is being done and provides a starting point for assessment, (The Conservation Union, 1994).

In Canada a pilot research was done among the Dene in Canada's north. This project was done over a period ranging from 1989 to intermittently through 1991. The purpose of this research was to gain an understanding of environmental knowledge still possessed by Denes and how this knowledge has been used to govern their use of land and its resources. Several key questions for documentation on environmental knowledge people still possessed and how this knowledge was used to survive and live in harmony with the natural environment. Secondly if they are any systems that were currently operating, and if so, what were the social, economic, cultural, and environmental factors that defined them. The research established that for environmental protection and sustainability to be achieved the initiative must come from the local people. The community must take responsibility for administering the projects, (Johnson, 1992).

In the report on the Status of Environmental Education in Zambia, Bwalya Chifwalo (1992) shows how Zambia has recognised the need to protect, preserve, and improve its environment to enhance good management and rational use of human and natural resources for sustainable development. Steps have been taken to tackle the problem of pollution, like the adoption and enactment of the environmental protection and pollution control act in 1990 is a clear festivity of the developmental ideas (Bwalya Chifwalo, 1992).

*Having realised the importance of environmental education, the statutory bodies provide a platform for educating the general public through various campaigns by government and non-governmental organisations on resource use and environmental protection. This is done at public functions like the Agricultural and Commercial Shows, World*

Environmental Day celebrations, through exhibitions, leaflets and speeches. Various NGOs are involved in public awareness campaigns (Bwalya Chifwalo, 1992).

## **2.8 Gaps in the Research**

The closest research done in Soweto Market on a related matter was part of the Lusaka Solid Waste Management Master Plan, of which the phase 1-Diagnosis was completed in 1997. In this research, it tried to identify the main issues related to the actual solid waste management problems in the city and further proposed possible solutions.

The research was too general as it considered the whole of Lusaka as a study area. The different areas making up Lusaka have different characteristics, even among the upgraded settlements. In the case of Soweto, it contains poor structures, poor road network and has no proper sanitation in place.

The Solid Waste Master Plan Lusaka, phase 1-Diagnosis final report (ECZ/LCC, 1997), reports that peri-urban dwellers have poor capacity to finance a solid waste removal service and that some people are not even ready to pay anything for the service. In line with this problem, the Lusaka city council does not have a system in place for collecting any rates from illegal settlements. The report concluded that it was doubtful that peri-urban communities, even with all possible education provided through good will, can afford a totally auto-financed refuse removal service.

This paints a very gloomy picture, showing that the peri-urban areas were doomed. In the methodology of the same document, only 34 respondents were administered with questionnaires to represent a population of 1.1 million people (CSO, 1990). Moreover the research limited the questionnaire to those who were recognised as stakeholders in solid waste management, i.e. officials who take important roles in decision-making. This denied detailed analysis of the situation through questionnaires. Peri-urban areas constitute 75% of the population of Lusaka and generate the most waste (in term of

density) and therefore suffer from acute problems as a result of poor solid waste management services (ECZ/LCC, 1997).

The document does not also show the effect of environmental knowledge possessed by the people on their perception of solid waste management. It further does not amplify the lack of sanitary storage systems as having one of the major effects on solid waste accumulation in the market. It was therefore necessary to visit a single settlement in the name of Soweto Market to find out whether the earlier generalised state of affairs was true for Soweto Market.

## **CHAPTER THREE**

### **DESCRIPTION OF STUDY AREA**

#### **3.1 General Description**

Zambia is a landlocked country south of the equator. The area of Zambia is 752,612 square kilometres, most of which forms a plateau lying between 1,000 and 1,600 metres above sea level (CSO, 2000). Among the provinces, Northern Province has the largest area of 147,826 square kilometres while Lusaka has the smallest with 21,896 square kilometres (CSO, 2000).

The most densely populated province in Zambia is Lusaka whose density has increased from 31.6 in 1980 to 45.1 in 1990 and to 63.5 persons per square kilometre in 2000. The population for Lusaka province gives an annual population growth rate of 3.5 percent. The growth rate has increased slightly from 2.7 percent in the 1980 – 1990 inter censal period and has now the highest growth rate in the country (CSO, 2000).

As a capital of a developing country, a large proportion of the population lives in substandard conditions, grouped in what is known as peri-urban areas or high – density areas. These are characterised by limited public services, like solid waste collection and disposal. The city includes 67 townships, and has over 20 markets (CSO, 2000 Census), which includes Soweto, the largest market in Lusaka (See Figure 3.1 for Map of Lusaka).

##### **3.1.1 Climate**

The climate is typical of much of the Zambian plateau, therefore it has tropical climate. There are three distinct seasons: a dry season or winter from mid April to August, a hot season from September to October and a rainy season from November to April. The average rainfall is about 812.80mm nearly all of which is recorded in the rainy season. In the cool season temperatures seldom exceed 23.9°C and often fall to the low tens on

cloudy days and at night. Temperatures of 32.2 °C and over are not uncommon in the hot season, when the humidity is comparatively high. Even during the hot season there is an average of almost 6 hours of sunshine a day and temperatures often reach the thirties. The height of the Lusaka plateau is some 1,300m above sea level and fresh easterly winds in the dry season and light variable winds in the rains combine to give this area a pleasant, healthy climate for most of the year (Simpson, 1963).

### **3.1.2 Geology**

The rocks of Lusaka are the metamorphic rocks belonging to the Katanga system. They are of pre-cambrian age and about 600 million years old. The flat-topped hills north of Lusaka, marking prominent quartzite horizons, are probably remnants of a cretaceous peneplain. Dolomites and limestone forming typical karrenfeld topography outcrop as flatling areas, whereas schists and quartzite underlie more broken, hilly country, the older quartzites in particular forming extensive ridges several metres high (Simpson, 1963).

Williams (1983), comments that the relationship between rock type and landforms is distinct, the main contrast being between the limestone, which forms a generally low lying and level surface with almost no surface drainage, and the schist being a more elevated, dissected and well watered landscape. These geological and relief contrasts have been critical in the development of the city.

The soil is mainly composed of alluvial to clay deposits. There is very little, sandy soil. In areas where soil is present, the maximum depth of such soils range between 2 to 3 metres (ECZ /LCC, 1997).

### **3.1.3 Rivers**

The main watercourses are the Ngwerere and Chalimbana streams, which drain most of the Northeast of the city and are gathered by the Chongwe River, a tributary of the Zambezi River, (Williams, 1983).

### **3.2 General Description of Soweto Market**

Soweto market started as a temporal site to facilitate the construction of the Lusaka City market. Therefore no formal plans to construct permanent structures were approved by the council. But with the growing demand for space and the growing population in near by areas like Kanyama, Chibolya, and Chinika, this led to the market growing beyond the expected limit. Soweto market is located between Mumbwa road and Los Angeles road. Just in front of the market is the Lusaka City market, which is separated from the rest of town centre by Lumumba road. See figure 3.2.

The population of Soweto market is estimated to be at 5000, this is according to Mr. Ndlovhu, the Administrative Officer for markets in Lusaka at the Council offices. This is according to a recent survey carried out in February by the council on the number of marketers that are registered with the council. The number of marketers has led to the market being overcrowded, implying serious social and health consequences.

The market is divided into six sections, that is; salaula section, vegetable section, chicken section, food dealers, hardware section and hand smiths. The food dealers section comprises the largest number of about 1800 food dealers; this is according to Mr. Chileshe the Health Coordinator at the market. He further adds that about 70 percent of the waste that accumulates in the market is as a result of vegetable dealers section.

The market has a fairly reasonable road network, but these roads become impassable in the rain season making most parts of the market inaccessible to most traders. Currently there is no water supply to the market because the boreholes where the water was pumped from have been closed. This has led to most marketers fetching their water from near by compounds like Kanyama, Chibolya, and the Lusaka City Market.

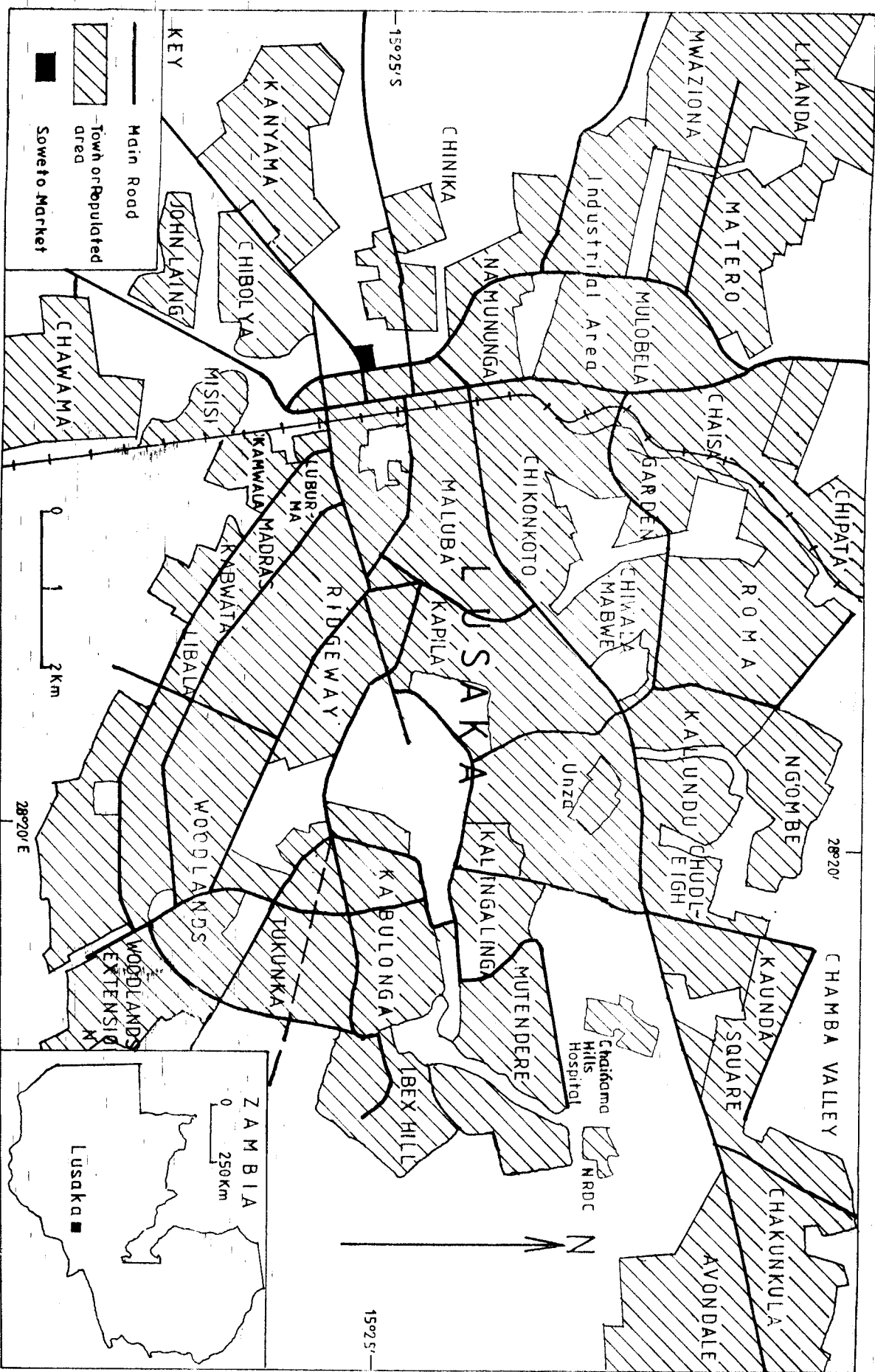
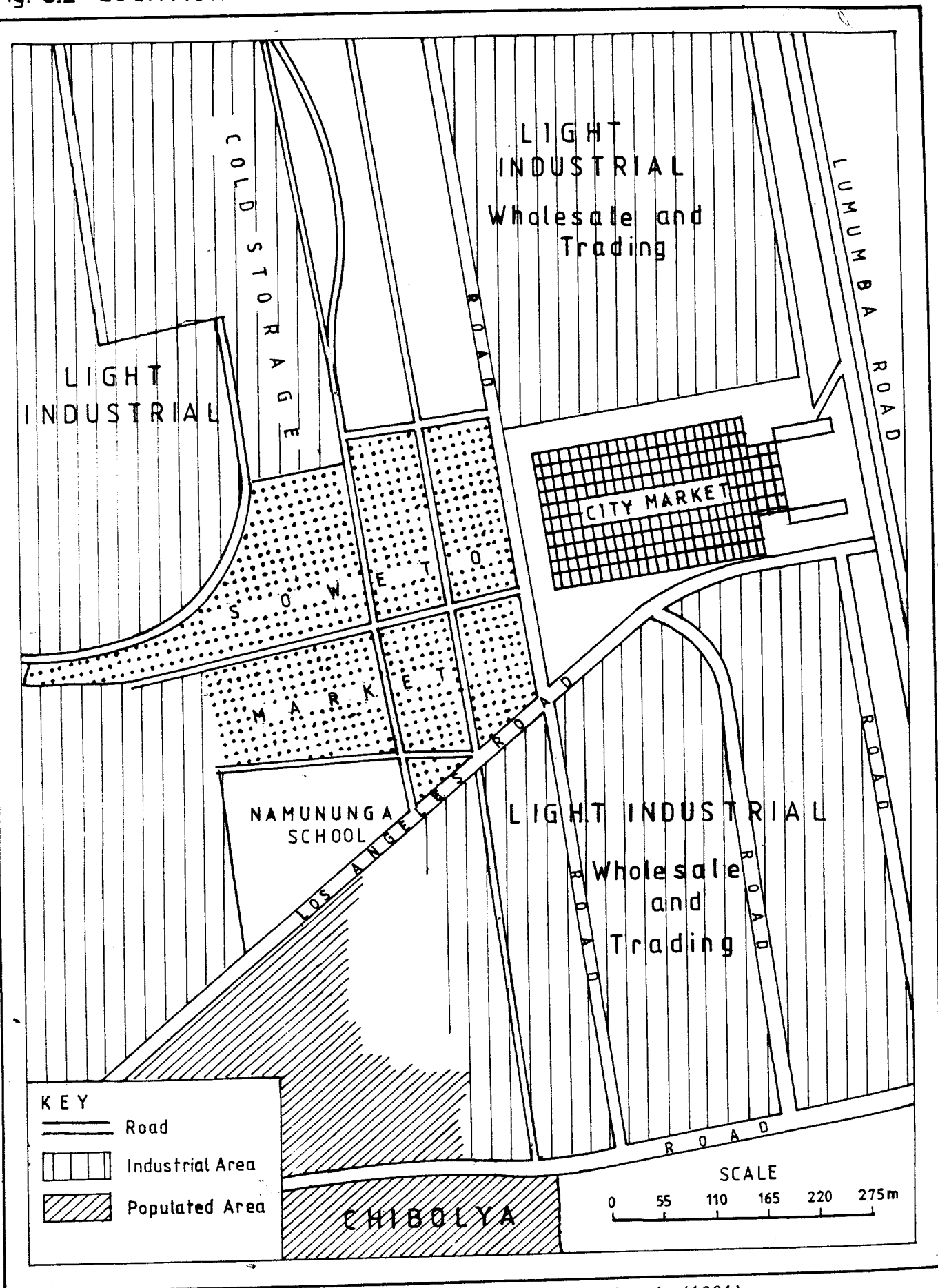


Fig. 3.2 LOCATION OF SOWETO and CITY MARKETS IN LUSAKA



Source: Surveyor General Satellite Image of Soweto Market in Lusaka (1991)

## **CHAPTER FOUR**

### **METHODOLOGY**

#### **4.1 SOURCES OF DATA**

##### **4.1.1 Primary Data**

Primary data was obtained through questionnaire interviews administered to the respondents (see appendix (1) for questionnaire). The other sources of primary data were by direct observation made by undertaking a self conducted tour around the market to see the extent of the market, as well as solid waste management tendencies among the market community.

##### **4.1.2 Secondary Data**

Secondary data were obtained from documents from ECZ, CSO, the City Council research unit on solid waste management in Lusaka and other related documents that were perceived to be helpful to the research. Another source of secondary data was the Council office at Soweto market, aided by a guided interview schedule. However, no other information was obtained from any NGO in the market because they are non-existent in the market. Though this was not clearly specified in the proposal, it was done to aid the quality of data obtained.

#### **4.2 Sampling frame, sample and sampling procedure**

##### **4.2.1 Sampling frame**

The sampling frame comprised all the stands in the market. The stand owner or an employee who had been in the market for at least more than two years made up the target population.

##### **4.2.2 Sample and sampling procedure**

Due to the organisational structure of the market and the time under which data collection was being done, it was just after the marketers were displaced. Hence no list of shop numbers exists in the market; most of the stands and structures are temporal. Therefore what was done was that, in each section of the market, the market is divided into six sections. From the six sections on average about seven stands were randomly selected at an interval of ten. Implying that every tenth shop from the first selected was picked.

Forty stands were interviewed using structured questionnaires, these were personally administered in order to translate and explain to those with a poor command of the English language and to reduce on the number of questionnaires that would be rejected. However, the size was limited by the time under which data collection was to be done.

#### **4.3 Methods of data analysis**

Quantitative data analysis was done using simple percentages, while qualitative data analysis was based on opinions from various stakeholders involved.

#### **4.4 Presentation of results**

Most of the data obtained from the forty respondents was summarised in table form showing variables, frequency, and percentage. It was shown in the form of bar graphs where necessary. Recommendations and suggestions made from different opinions of stakeholders, experts, were presented in descriptive form.

## CHAPTER FIVE

### RESULTS (PRESENTATION AND ANALYSIS)

#### 5.1 Profile of Respondents

The first six questions dealt with the profile and characteristics of respondents. These included age, sex, occupation, marital status, education, and the average income earned per month. Of the 40 respondents, 55% were male and 45% female, 15% were in the age group below 20 years old, 17.5% were between 20 to 24 years old, 25% were between 25 to 29 years, 17.5% were between 30 to 34 years, 25% were 35 years and above.

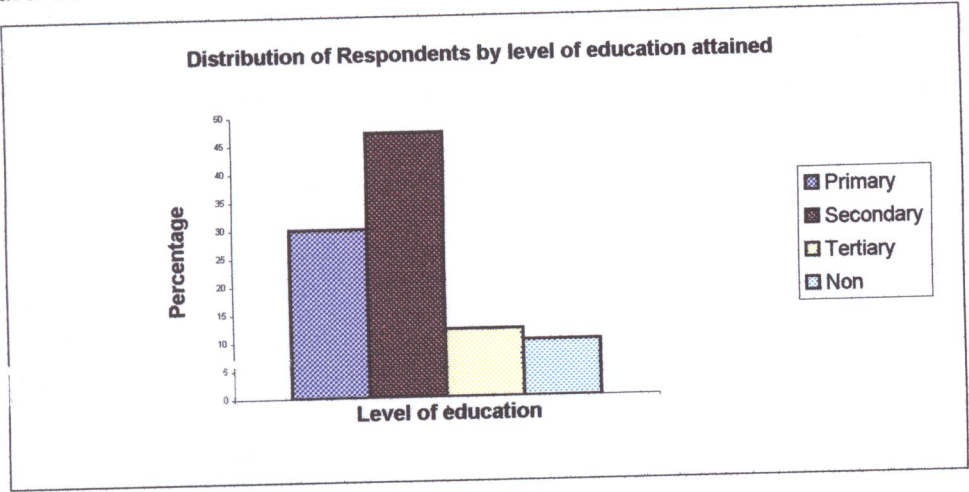
Their marital status was distributed as follows: 40% were single, 60% were married, none were divorced, separated or widowed respondents of the respondents interviewed.

The education status of the respondents was as follows: 30% of the respondents had attained primary school education, 47.5% attained education up to secondary, 12.5% attained tertiary education, whereas 10% had not attained any formal education. See Table 5.5 and figure 5.1.

Table 5.1: Summary of the educational status of respondents

EDUCATION LEVEL	NUMBER	PERCENTAGE (%)
PRIMARY	12	30
SECONDARY	19	47.5
TERTIARY	5	12.5
NONE	4	10
TOTAL	40	100

Figure5.1



The educational level is very important because this research tried to establish the relationship between environmental knowledge and solid waste management. It is being assumed that everyone who has attained any type of formal education has the ability to read and understand any literature published on solid waste management.

As for the economic activities, 75% of the respondents were doing their own business in the market, and 25% were employees of shop owners. See table 5.2.

Table 5.2: Summary of respondent’s economic activities.

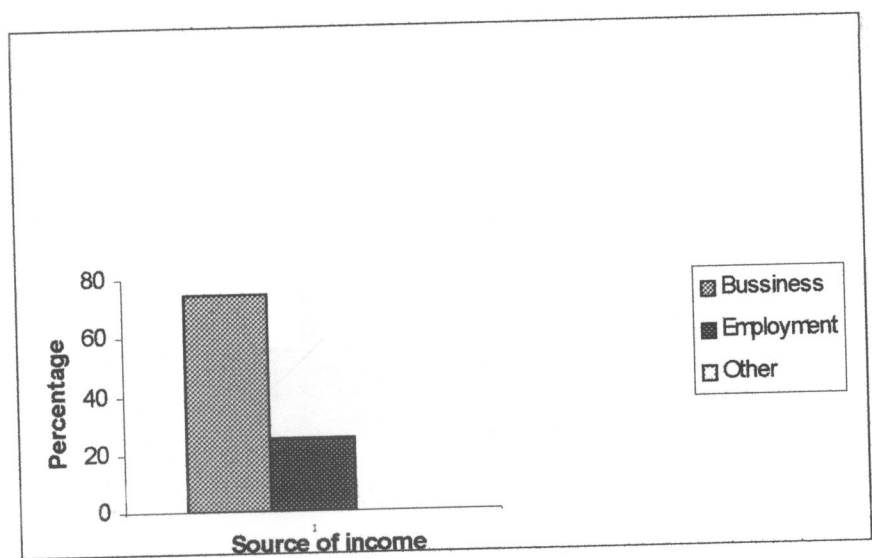
SOURCE OF INCOME	NUMBER	PERENTAGE (%)
BUSINESS	30	75
EMPLOYMENT	10	25
OTHER	0	0
TOTAL	40	100

**SOURCE: FIELD DATA**

Since this research tried to find out how a low-income community could contribute towards solid waste management, the members of the community were seen to be the key players. The respondent’s major source of income was looked at and their average income per month as well.

Figure 5.2 is a bar graph showing the major source of income for the respondents.

Figure 5.2: Distribution of respondents by major source of income



**SOURCE: FIELD DATA**

As for the average income earned by the respondents per month, 17.5% of the respondents earned less than K100, 000 per month. 30% earned between K100, 000 to K250, 000 per month, 32.5% earned between K250, 000 to K500, 000 per month, 17.5 % earned between K500, 000 to K1, 000, 000 per month, whereas only 2.5% of the respondents earned above K1, 000, 000 per month. See table 5.3.

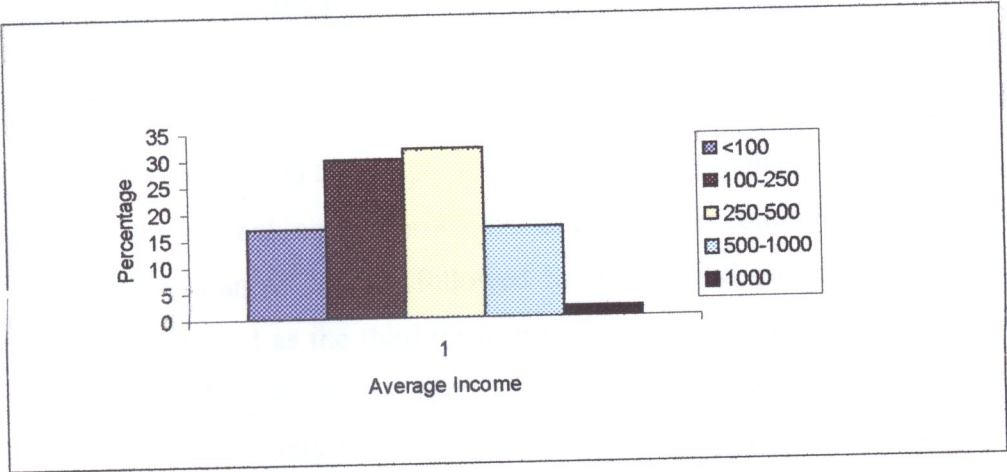
Table 5.3: Distribution of respondents by average income per month.

INCOME RANGE (K, 000)	NUMBER	PERCENTAGE (%)
< 100	7	17.5
100 – 250	12	30
250 – 500	13	32.5
500 – 1,000	7	17.5
>1,000	1	2.5
TOTAL	40	100

The average income earned per month by the respondent is very important because it has a bearing on the respondent’s ability to contribute towards solid waste management.

Figure 5.3 is a bar graph showing the distribution of respondents by their average income per month.

Figure 5.3: Distribution of respondents by average income per month



SOURCE: FIELD DATA

5.2 Understanding of Solid Waste

Questions 8, 9, and 28 in the questionnaire, probed respondents in relation to their understanding of solid waste, and if solid waste was considered to be a serious cause of disease in the community. 100% of the respondents considered solid waste to be a problem in the market. 100% further agreed that solid waste posed some danger to the community, 72.5% agreed that people in the market understood the dangers of indiscriminate dumping, whereas 27.5% said that the people in the market did not understand the dangers of indiscriminate dumping. See Table 5.4.

Table 5.4: Summary of respondents on their understanding of solid waste.

VARIABLES	YES	%	NO	%
Do you consider solid waste to be a problem in the market?	40	100	0	0
Does solid waste pose any type of danger?	40	100	0	0
Do you think people in the market understand the dangers of indiscriminate dumping?	29	72.5	11	27.5

**SOURCE: FIELD DATA**

Question 7 established the people's prioritization of problems faced by the market community by ranking the problems faced by the community; indiscriminate dumping was ranked highest followed by uncollected garbage. Deficient water supply was ranked as the third most prioritized problem and was ranked highest by 17.5% of the respondents. High incidence of diarrhoea and bad road network were least ranked. Only 5% of the people ranked them highest, and so they might not be so much of a priority for the majority of the population. A physical survey of the market proved that truly indiscriminate dumping of waste and uncollected waste were a major problem in the market.

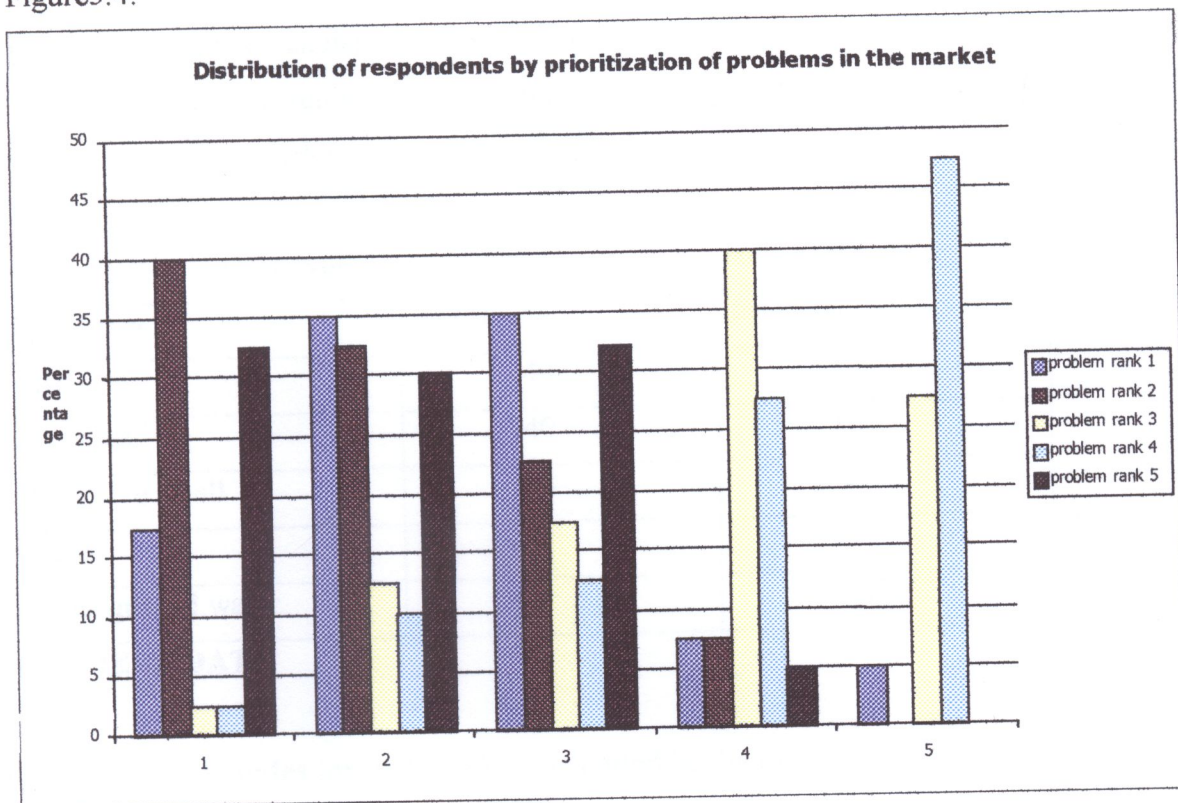
Table 5.5 and Figure 5.4 are a summary of respondents by their prioritization of problems in the market.

Table 5.5

PROBLEMS	1	%	2	%	3	%	4	%	5	%
WATER SUPPLY	7	17.5	14	35	14	35	3	7.5	2	5
INDISCRIMINATE DUMPING	16	40	13	32.5	9	22.5	3	7.5	0	0
BAD ROAD NETWORK	1	2.5	5	12.5	7	17.5	16	40	11	27.5
HIGH INCIDENCE OF DIARRHOE	1	2.5	4	10	5	12.5	11	27.5	19	47.5
UNCOLLECTED GARBAGE	13	32.5	12	30	13	32.2	2	5	0	0

1≡ MOST PERCIEVED PROBLEM  
5≡ LEAST IN TERMS OF PERCEPTION

Figure5.4:



#### VARIABLES

- 1: Water Supply
- 2: Indiscriminate dumping
- 3: Bad Road Network
- 4: High Incidence of Diarrhoea
- 5: Uncollected Garbage

#### **SOURCE: FIELD DATA**

Question 25 addressed the respondent's ability to identify if the litter that was in their surrounding posed any type of danger to them, and hundred percent agreed that the litter posed serious health hazards on the community. On the type of waste common to the community, hundred percent indicated an assorted amount of solid waste being the most prominent type of waste. Nobody indicated glass or any other form as a problem. This clear shows the effect the change in packaging from glass and paper to plastic packaging of bottled stuff and carrier bags, the majority of which are not biodegradable.

To question 26, all the respondents agreed that waste posed a visual nuisance as well as inducing diseases such as cholera and 85.0% said that the garbage heaps induced offensive smells. Seventy-seven and half percent said the heaps attracted flies and other pests, only 12.5% acknowledged that the waste could contaminate groundwater. See Table 5.6.

Table 5.6: A summary of the types of problems due to accumulated waste.

Type of problem	Total tally	Percentage
Visual nuisance	40	100
Induces diseases	40	100
Induces offensive smell	34	85
Attracts pests	31	77.5
Contaminates ground water	5	12.5

**SOURCE: FIELD DATA**

### 5.3 Perceptions and attitudes toward services provided in the market.

Questions 10 to 24 were on how people managed their solid waste and the services provided in the market, whether the council was doing enough in terms of solid waste management.

The largest number of people, 95% said the council was not doing enough in providing facilities for solid waste management, 5% agreed that the council was doing their job in terms of solid waste management.

Asked if there was any dumpsite in the market, 12.5% agreed that there was at least one dumpsite in the market. 87.5% denied having any knowledge of the existence of a dumpsite.

On the existence of a market committee in charge of solid waste management in the market, 17.5% said it existed, 82.5% denied the existence of such a body in the market.

When asked if there was a private company collecting solid waste in the market, 97.5% said that there was no company collecting waste in the market. Only 2.5% of the respondents agreed to the presence of a private company involved in solid waste management.

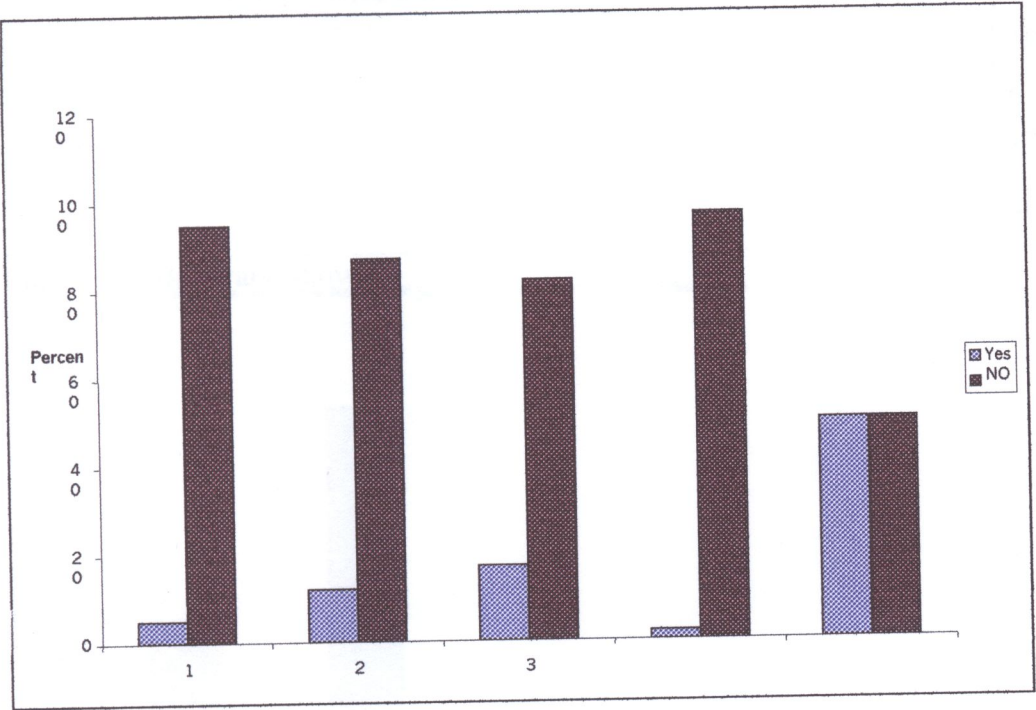
When asked if the service charge per shop per month was affordable, 50% agreed while the other 50% said the service charge was too high.

Table 5.7 and Figure 5.5 give a summary of the perceptions and attitudes respondents have towards services provided in the market.

Table 5.7: Perceptions and attitudes towards services provided

VARIABLES	YES	%	NO	%
Is the council doing enough in terms of solid waste management?	2	5	38	95
Is there a dumpsite at the market?	5	12.5	35	87.5
Is there a market committee in charge of solid waste management?	7	17.5	33	82.5
Do you have a private company collecting garbage?	1	2.5	39	97.5
Is the service charge affordable for you?	20	50	20	50

Figure 5.5: Bar graph showing perception on services provided in the market



VARIABLES

- 1: Is the council doing enough in terms of solid waste management?
- 2: Is there a dumpsite at the market?
- 3: Is there a market committee in charge of solid waste management?
- 4: Do you have private company collecting garbage?
- 5: Is the service charge affordable for you?

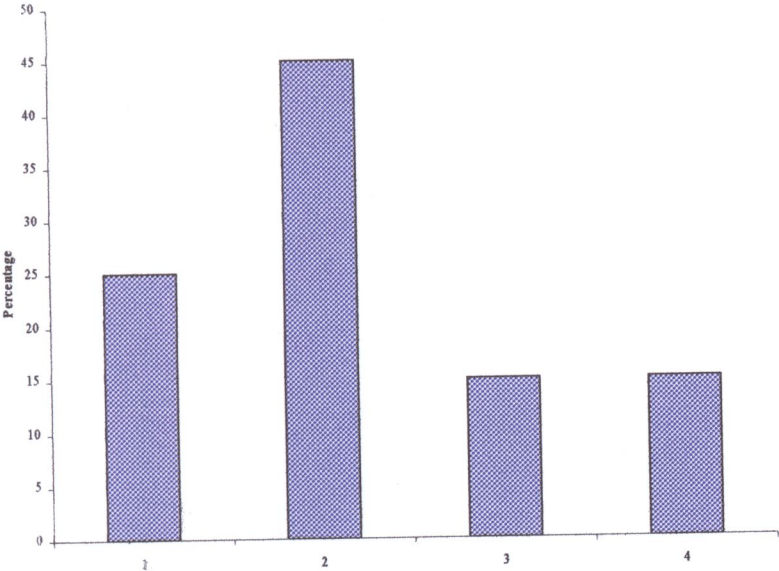
**5.4 Personal Attitudes Towards Improving Solid Waste Management.**

Questions 29 to 33 investigated personal attitudes towards improving solid waste management. Table 5.8 and Figure 5.6 show the distribution of respondents on the role they are willing to play in solid waste management. 25% were willing to help sensitize and educate the community, 45% said the most important role was to participate as a community, 15% were not willing to play any role in solid waste management, and the remaining 15% of the respondents were willing to contribute money towards solid waste management.

Table 5.8: Distribution of respondents on the role they should play in solid waste management.

VARIABLES	NUMBER	%
Help sensitise and educate the community	10	25
Participate as a community	18	45
Not willing to participate	6	15
Contribute money towards solid waste management	6	15
Total	40	100

Figure 5.6: Bar graph showing Distribution of the role they should play in solid waste management in the market



## VARIABLES

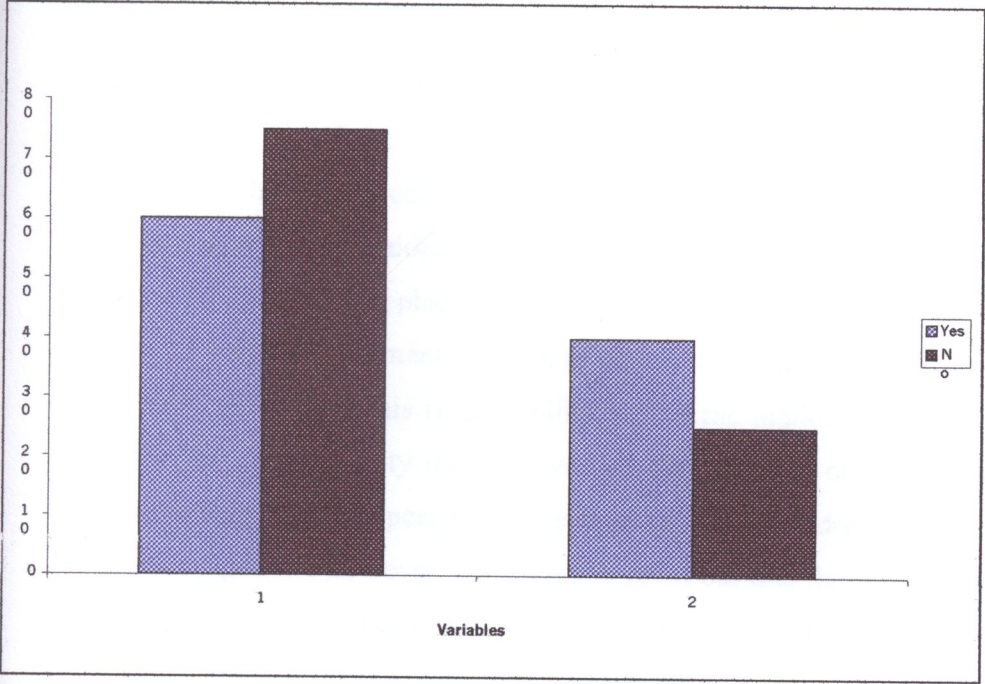
- 1: help to sensitize and educate the community.
- 2: participate as a community.
- 3: not willing to participate.
- 4: contribute money towards solid waste management.

Table 5.9 shows the distribution of respondents by their ability to participate in solid waste management. They were asked if they were willing to volunteer their time and 10% of their monthly earnings. 60% were willing to contribute 10% of their earnings toward solid waste management, 40% declined. 75% of the respondents were willing to volunteer their time in doing solid waste management, 25% declined to do so.

Table 5.9 Respondents ability to participate in solid waste management

VARIABLES	YES	%	NO	%
Are you willing to contribute 10% of your earnings towards solid waste management?	24	60	16	40
Are you willing to volunteer your time towards solid waste management/	30	75	10	25

Figure 5.7: Shows a bar graph representing the respondents ability to participate in solid waste management.



VARIABLES

- 1: Are you willing to contribute 10% of our earnings towards solid waste management?
- 2: Are you willing to volunteer our time towards solid waste management.

## **5.5 Interview with the Council Office**

Date: 03/09/2004

Time: 10:00hrs

Venue: Lusaka city council office at the market.

Name of the officer: Mr. Kaluba Chileshe

Position held in the council: Health Coordinator

This interview was done with the council office at the market basically to look at the programs put in place by the council at the Soweto market in response to the solid waste management problem faced in the market.

When asked what his responsibility was at the market, Mr. Chileshe mentioned that his responsibility mainly involved him carrying out health campaigns. The campaign involves peer-to-peer education, public addresses, and mass cleaning campaigns. He however, was quick to point out that these projects have not been effective mainly because of resistance and stigmatization from the marketers, and attributed this to poor educational background.

When asked about what programmes the council put in place to address solid waste in the market, Mr. Chileshe said the council had just taken over the running of the market from political party cadres in February. They currently have employed twenty (20) casual workers to work along side the office to clean up the market. The council has also embarked on a sensitization programme on waste accumulation and management, and that the council was also in the process of running partnership programmes with the Ministry of Health, National Institute for Scientific and Industrial Research (NISIR), and the Danish Fund for International Development (DFID).

Mr. Chileshe pointed out that there is a market advisory committee that consists of the councilor, the market master, two marketers, and two officers from the council. Their main role is to ensure that they maintain order in the market and are in charge of allocating shops to the marketers. He further pointed out that the

market is divided into six sections; the salaula, vegetable, chicken, food dealers, hard ware, and hand smiths, sections. Of these sections the food dealers are about 1800 in number and that 70% of the waste generated came from the vegetable section.

Mr.Chileshe noted that the main causes of solid waste management problems in the market were as a result of the marketers not having access to a dumping site and the knowledge people have on the effects of solid waste on the environment could be one of the major causes of indiscriminate dumping and other related problems. Mr.Chileshe said, despite the council charging K30, 000 per month per shop, the money was not adequately used to the benefit of the market because of political interferences in the market.

He was however, quick to mention that some of the environmental impacts that have resulted from solid waste are food pollution, air pollution from the constant burning of waste, land degradation, and pollution of the ground water in the area.

## **CHAPTER SIX**

### **DISCUSSION**

#### **6.0 Introduction**

In this chapter, the discussion centers on the people's perceptions and attitudes towards dumping of solid waste indiscriminately.

#### **6.1 People's socio-economic status and its effect on solid waste management at Soweto Market.**

Socio-economic status in Soweto Market affects people's attitude towards solid waste management in terms of attitudes in contributing money towards solid waste management. For instance only 60% of the people were willing to contribute 10% of their monthly income, considering the people's average income per month and major source of income shows that 69% of the people earned below K500, 000 per month and 75% of the people were doing their own business with only 25% being employed.

When compared to the percentage of people willing to volunteer <sup>their</sup> time towards solid waste management, the percentage of those willing to contribute their time towards solid waste increases by 15% to 75% showing willingness.

Ntengwe (1999), suggests the "polluter pays principle", cost of preventing, eliminating or compensating for damage to the environment must be borne by the party responsible. Cost of recovery from waste producers is an objective to be achieved in order to implement this principle, which will motivate them to behave in an environmentally sound manner.

However most people were quick to say that the main reason they were willing to contribute 10% of their monthly earnings is because that was the only way they can trade in a clean environment.

On the whole it can safely be argued that low socio-economic status among the people of Soweto Market influences their response towards solid waste management. This is so because of the 40% who did not want to contribute 10% of their earnings, 90% of which attributed that to their low income.

## **6.2 People's knowledge of the consequences that result from solid waste as well as their understanding of solid waste problems in the market.**

Generally it can be said that the levels of education attained by the people of Soweto Market is very high, because 90% of the people had at least attained primary, secondary, and tertiary form of education. This gives them the ability to read and at least understand materials published on the environment in English. As a result 40% of the respondents said indiscriminate dumping of waste was the number one problem being faced in the market. This was followed by another 32.5% who said the number one problem in the market was uncollected garbage. This shows that 72.5% of the people jointly agreed that solid waste related problems were the first priority problems in the market.

Hundred percent of the people consider solid waste to be a problem in the market and that the solid waste that litters their surrounding poses some danger. However, 72.5% of the people agree that the people in the market understand the dangers of indiscriminate dumping of waste in the market, but 27.5% say the problem was as a result of the people's understanding. They pointed out that this was so because no campaigns were done to educate the people on maintaining a clean and safe environment. Thus it can be concluded that people in the market are aware of the problem of solid waste in the market and the consequences the indiscriminate dumping can cause on the environment because of their prioritization of the same.

That is why Bwalya Chifwalo (1992), says that having realized the importance of environmental education, the statutory bodies provide a platform for educating the

general public through various campaigns by government and non-government organizations on resource use and environmental protection. This is done at public functions like the agricultural and commercial shows, world environmental day celebration, through exhibitions, leaflets and speeches. Various NGOs are involved in public awareness campaigns.

### **6.3 People's perception on services provided in the market and the influence this has on solid waste management.**

When it comes to people's perception on services provided in the market, there is a negative attitude towards services that are being provided, because 95% say the council is not doing enough in terms of providing services for solid waste management, while 87.5% say there is no dumpsite in the market. This has to a large extent affected their perception of the service charge in the market; as a result 50% think the market is still in the same state. Because of this 60% of the people say the council is not doing enough in terms of solid waste management in the market.

On what the people do with the garbage they produce from their shops, 55% say they dump indiscriminately because they don't have access to a dumpsite in the market. Although 30% say that they use their own bins as sanitary storage systems, they don't suffice for the entire market to be able to contain the amount of solid waste that is generated on a daily basis. Hence the theory that the availability of sanitary storage systems has an effect on indiscriminate dumping of waste comes into picture (Miller, 1988).

It can therefore be arguable to say that people (55 percent) of Soweto Market dump indiscriminately because they don't have access to sanitary storage systems.

### **6.4 Community participation and the effect it has on solid waste management at Soweto Market.**

The respondents came up with various suggestions on how to improve solid waste management, 95% said they participated actively in solid waste management. The highest demand was that there must be a regular collection of the waste. Those who advocated for the community to solve its own problems and not wait for outsiders followed this. This was, however overshadowed by those who still felt that the council was responsible for the improvement of solid waste management, though this was qualified by saying that the government should improve funding to the council. 25 percent of the people said they were willing to help sensitize and educate the community on the dangers of solid waste management, 15% were willing to contribute money toward solid waste management. Another group of 45% of the people advocated strongly for community participation, this accounts for 85% of the people willing to participate in solid waste management with an exception of 15% not willing to participate at all. This shows that the people's attitude towards solid waste management is positive and that if organized, the problem would be overcome easily. Ntengwe (1999) suggested that cooperation among all social groups is necessary in order to solve environmental problems. Steps that are to be taken to involve the community should be economically viable. In Soweto Market cooperation could be achieved by setting aside a fund specifically meant for solid waste management by asking the marketers to contribute a percentage towards waste management of which the community is willing to do.

In the final analysis it can be argued that despite being knowledgeable of the consequences by some people in Soweto Market that result from dumping of solid waste indiscriminately, their perception and attitudes will remain indifferent because they don't have access to sanitary storage facilities even though they are willing to participate as a community.

## **CHAPTER SEVEN**

### **CONCLUSION AND RECOMMENDATIONS**

#### **7.0 Introduction**

In this chapter, the major findings based on the objectives of the research and conclusions have been presented.

#### **7.1 Conclusion**

It was established that the major stakeholders in solid waste management were the members of the community since they are the ones that generate waste and suffer the consequences emanating from uncollected waste.

Having realized that at the center of the discourse are the members of the community and not outsiders, they have started realizing that they are directly affected when a disease breaks out. As a result of this, their attitude is slowly changing from being passive to taking an active and leading role in shaping a habitable environment through personal hygiene, to educating others on the importance of a clean environment. As already noted, the people are willing to volunteer their time and money to better their working environment, and are beginning to provide their own sanitary storage systems. This is the first and most important step of community participation to be taken in solid waste management, which should start at the point of waste generation.

The change in attitude and willingness to participate in solid waste management is an important turning point that must be encouraged by the government through the council by providing the necessary support and backing that the marketers would need for this cause. This can only be enhanced through educational campaigns, so as to ensure that the message of waste management is put across as

a major issue in the community, especially during economic hardships, there is likely to be no driving force for upholding management standards and even less for improving them. Hence the people's perception of solid waste to a great extent determines their willingness to be involved in the management.

From what has been observed in the results, it can be concluded that to some extent, most of the people at Soweto Market are aware of the consequences that arise from indiscriminate dumping of waste, except that lack of access to sanitary storage systems and waste management facilities has given rise to the perpetuated indiscriminate dumping of waste. Most people have decided to ignore the consequences provided they are not directly affected in the short term.

A good number of people at Soweto Market are influenced by their socio-economic status as a factor affecting their ability to participate as a community in solid waste management. For instance most of them would prefer to volunteer their time to contributing their money towards solid waste management, for some it leaves much to be desired as to even volunteering their time would mean them losing out on an opportunity to make money.

Hence the only answer as suggested by more than 50% of the people as their recommendations, lies in the fact that the community needs to take a leading role in participating in solid waste management by educating others and providing or contributing in the form of money and time towards acquiring sanitary storage systems and improving facilities of solid waste management.

## **7.2 Recommendations**

7.2.1. Set up of a solid waste management fund that will be coordinated by the marketers with the guidance of the council.

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## APPENDIX 1

### Solid Waste Management in Lusaka's Soweto Market Questionnaire

#### SECTION A: BACKGROUD INFORMATON.

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(Please indicate by ticking (✓) were applicable.

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Use only. ☐

1. Sex: (a) Male ☐  
(b) Female ☐
2. Age: -----
3. Level of education attained:  
(a) Primary ☐  
(b) Secondary ☐  
(c) Tertiary ☐  
(d) No formal education ☐
4. Marital Status:  
(a) Single ☐  
(b) Married ☐  
(c) Divorced ☐  
(d) Widowed ☐  
(e) Separated ☐
5. Major source of income:  
(a) Business ☐  
(b) Employment ☐  
(c) Other (specify) -----
6. Income (average income per month):  
(a) Less than K100, 000 ☐

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- (b) K100, 000 to K250, 000      ☐
- (c) K250, 000 to K500, 000      ☐
- (d) K500, 000 to K1, 000,000      ☐
- (e) More than K1, 000,000      ☐

**SECTION B: GENERAL INFORMATION.**

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Use only. ☐

General information on your understanding on solid waste and problems in your community is required in this section.

7. What problems affect your community? (List them in order of priority by assigning Numbers 1 to 5)

- (a) Water supply      ☐
- (b) Indiscriminate dumping of garbage      ☐
- (c) Bad road network      ☐
- (d) High incidence of diarrhea      ☐
- (e) Uncollected garbage      ☐

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[      ]  
[      ]  
[      ]  
[      ]

8. What is your understanding of solid waste?

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[      ]

9. Do you consider solid waste to be a problem in your community?

- (a) Yes      ☐
- (b) No      ☐

[      ]

If your answer to question 9 was yes;

10. Who is responsible for the problem of solid waste in this community?

- (a) Traders      ☐
- (b) Council authorities      ☐
- (c) Market community      ☐
- (d) Other (specify) -----

[      ]

11. Do you have a market committee in charge of solid waste management?

- (a) Yes ☐
- (b) No ☐
- (c) I don't know ☐

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12. If your answer to question 11 is yes, how often do they collect garbage in the market?

- (a) Regularly ☐
- (b) Not regularly ☐
- (c) Not at all ☐

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13. Do you participate in garbage collection in this community?

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- (a) Yes ☐
- (b) No ☐

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14. If yes to question 13; what do you do with the garbage you produce from your shop?

- (a) Dump in a garbage pit or heap ☐
- (b) Dump in own dust bin ☐
- (c) Dump indiscriminately ☐

[ ]

15. If your answer to question 14 is (c). Why do you dump indiscriminately?

- (a) No access to a rubbish pit ☐
- (b) Pit is located far away from shop ☐
- (c) Other (specify) .....

[ ]

16. In your opinion do you think Lusaka city council is doing enough in terms of solid

Waste management in the market?

- (a) Yes ☐
- (b) No ☐

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17. Give reason for your answer.

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18. Is there any dumpsite in the market?

- (a) Yes ☐

[ ]

- (b) No ☐
19. If yes, how many dump sites are there in the market?
- (a) One ☐
- (b) Two ☐
- (c) Three ☐
- (d) More than three ☐
20. Do you have private company collecting garbage in the market?
- (a) Yes ☐
- (b) No ☐
21. If yes, how often do they collect the garbage?
- (a) Once a week ☐
- (b) Twice a week ☐
- (c) Three times a week ☐
- (d) Other (specify) \_\_\_\_\_
22. What is the service charge per shop per month?
- K\_\_\_\_\_.
23. Is the service charge affordable for you?
- (a) Yes ☐
- (b) No ☐
24. If No, how much are you willing to pay?
- K\_\_\_\_\_.

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## **SECTION C: RESPONDENTS PERCEPTION ABOUT INDICRIMINATE**

### **DUMPING OF SOLID WASTE**

25. Do you think that the refuse that litters your surroundings posses any type of danger?
- (a) Yes ☐
- (b) No ☐

26. If your answer to question 27 is yes, what are the dangers litter may cause?

(You can choose more than one variable).

- (a) Induces diseases like cholera.     ()
- (b) Brings about flies                     ()
- (c) Provides visual nuisance             ()
- (d) Induces offensive smells             ()
- (e) Contamination of ground water

27. Do you think the people in your community understand the dangers of indiscriminate dumping of refuse?

- (a) Yes                     ()
- (b) No                     ()
- (c) I don't know     ()

28. In your opinion do you think the problem of indiscriminate dumping of garbage is as a result of the level of understanding people have about solid waste?

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29. As a member of the community, what role should people like yourself play towards solid waste management?

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

30. If you were requested to contribute 10% of your earnings towards solid waste management, would you agree?

- (a) Yes 0
- (b) No 0

31. Give a reason for your answer in question 30.

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.....

32. If asked to volunteer your time to participate in solid waste management, would you agree?

- (a) Yes 0
- (b) No 0

33. Give a reason for your answer in question 32.

.....

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34. Is there any community based Organization involved in solid waste management in your community.

- (a) Yes
- (b) No

35. If yes to question 34 what is the name of the Organization?

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36. What suggestions would you give to improve the removal of garbage from your community?

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Thank you for your co-operation.

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## **APPENDIX 2**

### **INTERVEIW SCHEDULE FOR THE COUNCIL AUTHORITY**

1. What is your name?
2. What is your position in the council?
3. What links exist between the council and the Soweto Market?
4. What programmes has the council put in place to address solid waste in the market?
5. What facilities does the council provide to assist in solid waste management?
6. What is the estimated population of the market?
7. What are the underlying causes of solid waste problems in the market?
8. How much does the council charge the marketers as rent?