PROBLEMS OF SANITATION IN HIGH DENSITY SELF HELP RESIDENTIAL AREAS: THE CASE OF MALOTA - LIVINGSTONE

BY

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DEDICATION

To my dear parents, young brothers and sisters, and fiance Eric who have been a source of inspiration. I love you all. May God bless you.

DECLARATION

"I, SAMWINGA EUNICE NTWALA declare that this project has been composed by me and that the work recorded is my own. All maps and diagrams were drawn by me, and all quotations have been distinguished by quotations marks. The source of all materials referred to have been specifically acknowledged and the project has not been previously submitted for an academic award.

Signature: _____

Date: _____

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ABSTRACT

Sanitation in Malota Compound just like in any other high density self-help residential area is one of the most important and persistent problems of urban life. Malota is one of the squatter settlements that were upgraded. It is also one of the upgraded areas which have benefited from the PUSH programme.

The study aimed at investigating the problems of Sanitation which prevail in Malota Compound. This was achieved by among other things, identifying the methods of sewage and solid wastes disposal in the Compound, finding out the problems that are associated with sewage and solid waste disposal and investigating the extent to which the local community is involved in solving the problems of sewage and solid wastes disposal.

The stratified random sampling method was used to get a sample of 52 respondents from Malota. It was found out that most of the people use pits and sacks to dispose off the refuse. The pits and sacks are in most cases close to dwelling units and pose a risk to the health of the people. This is because they act as breading places for disease vectors such as houseflies which easily find their way to human beings. The high occurrence of diarrhoea diseases in the compound is evidence for the above fact.

Residents of Malota are currently doing something to help, alleviate the problems of sanitation which they are facing, this of course is done through the assistance of the Peri-Urban Self Help (PUSH) programme. The people dig drains, collect refuse from the streets in the compound, unblock sewers and so on, and are given food in return. The fact that most of them are only willing to do the work

because of what they get in return shows that the approach used for community participation is not sustainable. This means that once the food is not provided, nothing or little will be done to alleviate the problems of sanitation in the Compound.

The upgraded areas have the right to be provided with normal urban services and utilities such as piped water, sewage disposal and surface water drainage. Though this is supposed to be the case, the Municipal Council is too constrained to help in solving the problems of sanitation in the compound. The low investment in sanitation has led to this situation.

There is an urgent need for the councils to come up with solutions to the problems of sanitation in high density self-help residential areas. These solutions must address the adverse effects that poor sanitation has on the people in these areas. They must also consider sustainable community participation approaches.

CHAPTER ONE

INTRODUCTION

1.1 Sanitation: A Universal Squatter Settlement Problem

Sanitation in squatter settlements constitutes one of the most important and persistent problems of urban life. Just as squatter settlements are of all types, shapes and forms, sanitation problems in these settlements vary from one settlement to another sanitation problems also do vary. Squatter settlements in Dakar and Lagos steam with high humidity and stinky open drains whilst those in India have lanes and refuse heaps which are covered in human excrement. Commenting on this Clinard (1966:79) says that "people are prejudiced against latrines because they are smelly and dirty". Since others use them for defection, they fear to have a polluted caste. The fact that squatter settlements are not planned causes them to lack basic facilities and services. Poor sanitation among other things reflects the way of life found in squatter settlements.

The unrepaired streets and sidewalks, and infrequently collected solid wastes play a role in making the environment in such areas undesirable. It is this lack of facilities and services that is often stressed in defining squatter settlements in Less Developed Countries (LDCs). Lack of water and sanitary facilities are common in LDCs. In most cases several people share one water tap and have to carry water for long distances. This means that time and energy which were supposed to be used for other domestic chores are spent on fetching water. Excreta disposal remains one of

the stubbornly persistent problems of squatters. "Skyscrapers may shoot up side by side with colonies of slum dwellers whose only latrine is a rarely cleaned trench shared by hundreds of families...."(Clinard 1966:9).

Before the policy on squatter settlements upgrading was put in place, squatter settlements were not serviced by the Council. This is because at that time the government's stand was to demolish these illegal settlements and repatriate the residents back to their villages. This therefore means that the settlements had no piped water services or water borne sewage systems. For example, George Compound in Lusaka, Zambia, had wells as the only source of water before it was upgraded. This water was polluted and need was seen for them to have good drinking water. A piped water systems had to be put in place in 1973. Though this was the case, the growth of the compound makes the standpipes inadequate. In as far as excreta disposal is concerned, pit latrines still remain as the method for disposing excreta in the compound (Schlyter and Schlyter 1979). Though the Squatter Upgrading Programme was meant to alleviate the problems of Sanitation in Squatter Settlements, we still find these problems existing because the councils do not have enough money to cater for their needs.

A number of problems do arise from squatting. Examples are lack of social services like education and health. Water related epidemics such as cholera, dysentery and typhoid are prevalent in Squatter Settlements (Daka 1992). Apart from posing great risks of diseases, Squatter Settlements also pose enormous risk of social

problems. A high incidence of deviant behaviour such as crime, drug abuse, drunkenness, juvenile delinquency, illegitimacy, family maladjustment and prostitution have long been associated with squatter living (Clinard 1966).

Poor sanitation in squatter settlements is as a result of a number of reasons. First and foremost, squatter settlements are illegal in that no squatter owns the land on which his dwelling stands. This therefore means that they lack security of tenure. Since they hear rumours about their being visited by government demolished squads, they see no reason for spending money on improving a house which may be demolished at any time. Another reason for poor sanitation in these areas is that "since job opportunities materialise or evaporate in any given city over years, a good proportion of squatters are relatively mobile and prefer freedom of movement with little financial loss that a cheap dwelling confers" (American Friends Services Committee (AFSC) 1975:4).

1.1.1 Squatter Living Conditions

People in Squatter Settlements come from a broad cross section of lower income groups. Some of the important facts about Squatter Settlements are as follows. Compared to other urban dwellers, squatters form a large proportion of uneducated people and low proportion of secondary educated people. Squatters are not all "straight from the bush" as most people think for among them are found second generation urban dwellers. Of late it has been noted that a high percentage of householders in squatter areas are working. According to GRZ (1975:70).

".... the community generates its own economy and employment in shops, bars, services industries (such as Radio Repair, Shoe Repair, etc.) Manufacturing industry such as clothing, furniture and so on."

Therefore, it means that the squatters are in most cases self employed.

A good number of scholars have stated that unplanned urban settlements are found on the periphery of cities. Though this is the case, we find that squatter settlements in Zambia are often located close to places of employment and therefore reduce on transport costs and time for those who are employed (Mason 1980). GRZ (1975:69) records this.

Mwaziona and Chaisa are convenient for Industrial areas, Chawama for Cairo Road, and Kalingalinga for the University of Zambia and government offices. People live there because they are convenient, and are prepared to live at a higher density and in worse conditions in order to have this convenience.

1.2 Concept of Sanitation in Squatter Settlements

Squatter settlements are not part of the Local Authorities' official areas and therefore, the Local Authorities do not consider themselves responsible for providing sanitary facilities in these areas. It is up to the squatters to find ways and means of providing themselves with these facilities. Once a squatter settlement is upgraded, it is the responsibility of the government or Local Authority to be specific to provide and maintain drains, dustbins, latrines or toilets and taps. There are very few who inspite of facing hardships as a result of the absence of these facilities do think of participating

in the provision and maintenance of such facilities. Most of them feel little responsibility for taking proper care of sanitary facilities. This has resulted in poor sanitation in squatter or upgraded areas.

1.3 Definition of Sanitation

Several scholars have come up with ways of defining sanitation. Fanceys et al (1992:3) gives us the following definitions.

1. Sanitation refers to all conditions that effect health, especially with regard to dirt and infection and specifically to the drainage and disposal of refuse from houses.
2. Sanitation is the means of collecting and disposing of excreta and community liquid wastes in a hygienic way so as not to endanger the healthy of individuals and community as a whole.

Schaefer (1192:211) defines it as "the removal and safe disposal of wastes that can be a hazard to health". In this study sanitation will be defined as the efficient disposal of solid waste and sewage, efficient storm water drainage and water supply. These four aspects of sanitation are crucial to the health of people.

1.4 Focus of the Study

There are a number of studies that have been carried out on squatter settlements and in most if not all of these studies one issue stands prominent, that is, the type of house (AFSC 1995, Daka 1992 and Mason 1980). In this case little

attention has been given to sanitation. However, the upgrading process has brought some changes in Squatter Settlements. This has included the provision of roads, piped water supply and drainage. This study will therefore focus on sanitation.

1.5 Study Objectives

One of the major problems faced by residents in high density self-help residential areas is sanitation. This study therefore aims at investigating the problems of sanitation which people in Malota Compound, in Livingstone are facing. The following specific objectives will be addressed.

a. To identify the water supply system in Malota Compound.

b. To identify methods of sewage and solid waste disposal in the Compound.

c. To find out the problems that are associated with sewage and solid waste disposal.

d. To investigate the extent to which the local community is involved in solving the problems of sewage and solid waste disposal.

e. To assess the effectiveness of the government policy on sanitation in upgraded areas.

1.6 Rationale

Jones (1975:14) quotes Monlau (1851) by stating that "public health is gold". This statement reveals the fact that the health of the people, a community, or a country is precious. It is believed that poor sanitation adversely affects the health of the people living in such an environment and this in turn can affect their productivity. It is in view of the above that the promotion of health is the main reason for undertaking a study on sanitation.

The study's significance is magnified by the fact that high density self-help residential areas are associated with epidemics that are related to sanitation. Kanyama and Misisi in Lusaka are good examples of compounds were there have been outbreaks of cholera. Therefore, the study can help to bring awareness of the need for hygiene among individuals. Once sanitation is improved, the quality of the environment will be improved and the same will apply to the quality of life.

In addition, the study attempts to present the attitude that the community has in alleviating the problems it is facing in the area of sanitation. This will enable policy makers to formulate policies that are aimed at the effective way of providing sanitation services.

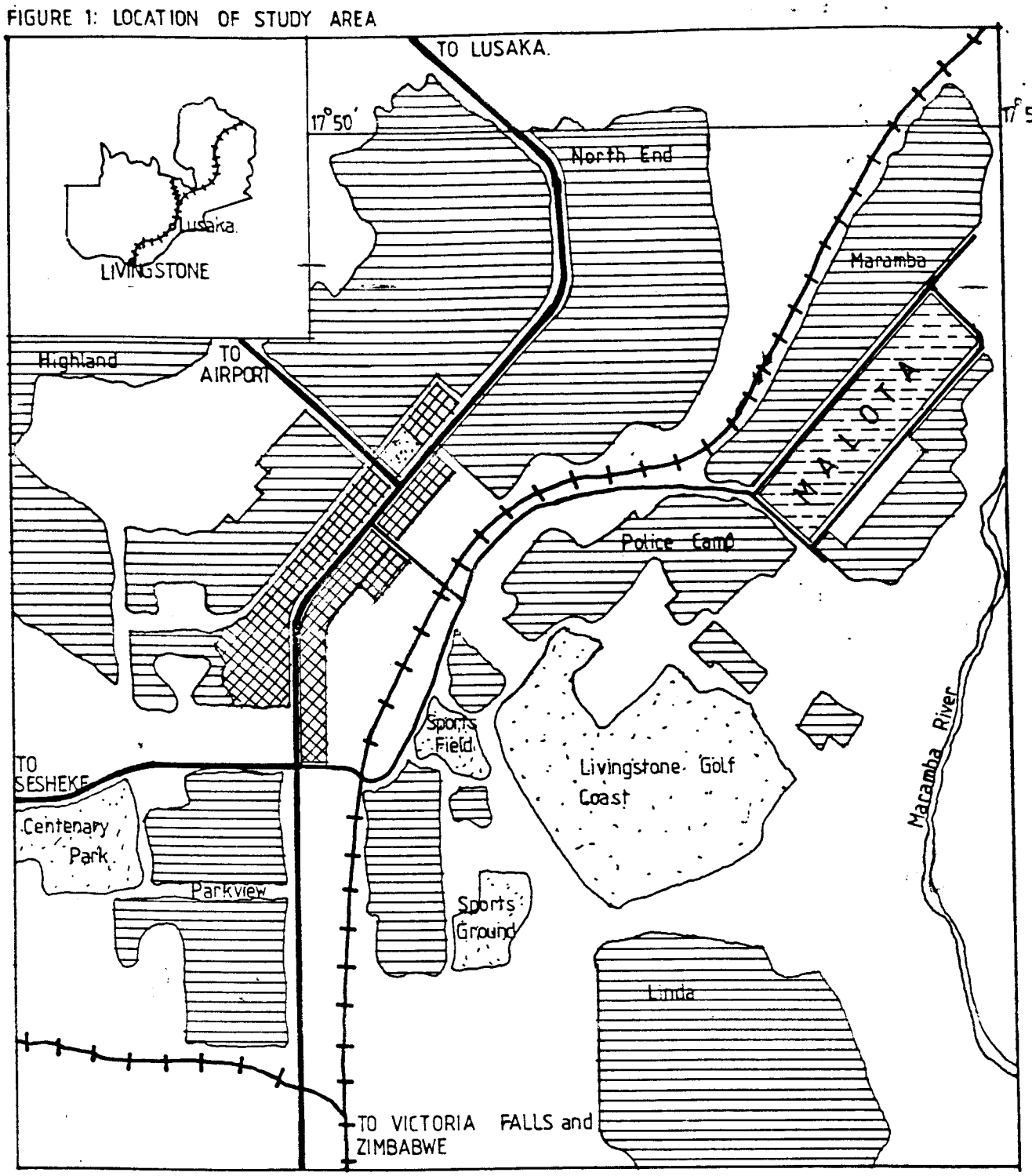
1.7 Location of the Study Area

Malota Compound is about 1.5km East of the Central Business District. It is nearly surrounded by Maramba. Figure 1 shows this. The Compound has a population of slightly over ten thousand people.

1.8 Organisation of the Study

The study is divided into five chapters. Chapter two provides the background information to the study in that it reviews the available literature on the study subject. This is done by first considering good sanitation as a pre-requisite for a healthy society, followed by sanitation in Third World Squatter Settlements and Sanitation in Zambian Squatter Settlements. Thereafter the four aspects of sanitation (water supply, sewage disposal, stormwater drainage and solid waste disposal) being dealt with in the study are discussed.

FIGURE 1: LOCATION OF STUDY AREA



LEGEND

Study area (Malota)	
Residential area	
Central Business District (CBD)	
Recreational open space	
River	
Major road	
Minor road	
Rail line.	

Scale 1 :20,000

Metres 1000 500 0 1 Kilometre.

: 8 : SOURCE:LIVINGSTONE STREET MAP

CHAPTER TWO

LITERATURE REVIEW

2.1 Good Sanitation: A pre-requisite for a Healthy Society

Good sanitation is an essential pre-requisite for a healthy society which in turn is important in national building. GRZ (1984:5) quotes the resolution which was made by participants of the United Nations Conference held in Argentina in 1977.

"All people whatever their state of development and their social and economic conditions, have the right to have access to drinking water in quantities and of qualities equal to their basic needs. Similar considerations apply to all the disposal of waste water, including sewage and other harmful sources, which are the main task of public sanitation systems of each country."

The above resolution recognises the fact that adequate and accessible supplies of water together with proper sewage disposal methods are basic health needs and essential component of primary health care, and indeed improved sanitation.

2.2 Sanitation in Third World Squatter Settlements

The importance of Sanitation in Less Developed Countries (LDCs) cannot be questioned. According to Mutizwa-Mangiza (1988), most of these countries are poor and this is manifested by poor health which in turn is manifested by high rates of mortality and comparatively shorter life spans. Poor sanitary facilities are the cause of the killer disease in these countries. The table below shows the percentage of the population in LDCs) of the World Health Organisation (WHO) regions who did not have adequate Sanitation during the years 1970, 1975, 1980 and 1988.

Table 1: Percentage of population without adequate Sanitation

WHO REGION	1970		1975		1980		1988	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
AFRICA	53	77	25	72	46	80	46	79
AMERICAS	24	76	20	75	44	80	10	64
EASTERN MEDITERRANEAN	38	88	37	86	43	93	6	80
SOUTH EAST ASIA	67	96	69	96	70	94	59	89
WESTERN PACIFIC	19	81	19	57	7	37	11	31
GLOBAL TOTAL	46	91	50	89	50	87	33	81

Source: Franceys et al (1992:4)

According to Sinnatamby (1990) about two billion people or sixty percent of those who live in LDCs do not have sanitary means to dispose of human wastes. Today slightly over half of the urban population in these areas have access to adequate sanitation. Africa being one of the continents comprising LDCs is no exception to this situation. Between thirty to sixty percent of the urban population on the continent live in informal or illegal settlements. It has been noted that the ratio of those served by sanitary facilities in these areas to those who are not is typically no better than that in rural areas.

The urban poor who live in these densely populated areas have a strong felt need for sanitation. The need for privacy and to spend less on waste disposal gives rise

to this situation. "....An increasing volume of literature suggests that health problems that result from - among other factors - lack of sanitation facilities are greater among the urban poor living in overcrowded, cheap rental accommodation or informal or illegal settlements than they are either in the rest of urban areas or in rural areas" (sinnatamby 1990:128). For example, water-borne diseases are said to be persistent in Nigeria due to water using habits of many standpipes (Okediji 1972).

2.3 Sanitation in Zambian Squatter Settlements

In Zambia just as in other countries, the government was not initially responsible for the provision of basic social services in Squatter Settlements. This is because "these settlements are not part of the planned housing areas and as such local governments are not obliged to provide facilities like water supply" (Martin 1975:72). It was only in 1972 that the government came up with a new policy on Squatter Settlements. The case of George Compound in Lusaka is a good example.

The only source of water in George Compound in 1969 was from wells. Well water was polluted and need was seen to have good drinking water. The government arranged for tank lorries to be taking water to the compound, but this was inadequate. Therefore, a piped supply system had to be put in place in 1973. The digging of trenches for pipes was done by the residents and the City Council engineers helped in connecting pipes to the Municipal Water Supply Network. Though the taps were few and far away from many households, the situation of water supply was made better than it was before (Schlyter and Schlyter 1979).

In a squatter settlement, excreta disposal is a private affair. Therefore, it is up to each resident or household to provide himself or itself with a place where excreta

can be disposed and pit latrines are in this case used. Some families get together and dig a latrine, and others just use their neighbours latrines. In George Compound pit latrines are still used inspite of the upgrading activities (Schlyter and Schlyter 1979 and Schlyter 1981).

Natural conditions in George Compound are not as bad as in other squatter areas of Lusaka though large areas get swampy in the rain season. Even if the above is the case, storm water drains were provided along the upgraded road. Schlyter (1981:31,32) states that "occasional during rainy seasons ditches were dug to connect with drainage channels, which diminished and the risk of flooding in large parts of George.

In 1976, there was no collection of garbage in George and the only places which had some dust bins were the markets. This resulted into some parts of the compound looking very untidy and things getting worse due to the growing use of non-returnable packaging (Schlyter and Schlyter 1979). Pits are used for disposing garbage in the compound. This being the case, there is need for the residents to be careful with the way they take care of the garbage for the pits can be a breeding place for vectors.

2.4 Water Supply

The motto for Lusaka and Water and Sewerage Company is "Water is life, Conserve it". This maxim is commonly used by people in order to express the importance of water. For sure water is essential for life and its use by animals, man

and plants is universal. No life can exist without water. In the case of man, it has been proved that though he can go for nearly two months without food, he can only live for three to four days without water (Wright 1956).

In as far as water supply is concerned, it has been noted that people in high density self-help residential areas pay a lot in time and diseases. The payment of time considers the fact that they queue at public taps which provide water for few hours each day. Improved water supplies are believed to be able to reduce or eliminate disease. Though the relation of personal hygiene to health has been recognised for many years, "Cleanliness next to godliness" is very much a nineteenth century maxim. The maxim reveals the significance of cleanliness. Carruthers (1973:43) states that "whilst it is not disputed that unsafe supply is a hazard to health, and safe supply is perhaps necessary for improved health, a safe supply is by no means sufficient for improved health". In this statement Carruthers (1973) saw the need for expanding the meaning of the word "safe" to include quantity as well as quality. This reveals the fact that apart from the water supply being free of contamination, the per capital consumption levels ought to be high as well for it to be considered a safe domestic water supply.

2.4.1 Quality and Quantity

The problem which is faced most actually by people in high density self help areas is the access to water in adequate quantity with reasonable convenience. There is need for community water supply systems to save more than the bare minimum needs of safe water for drinking and culinary purposes. "The health, comfort and convenience, additional quantities for bathing, washing

and public cleansing are necessary" (WHO 1972:36). Increased water availability helps control water washed infections (infections due to lack of water for personal hygiene). These infections can either be of the skin and eyes such as scabies and trachoma, or diarrhoea diseases of which bacillary dysentery is a good example.

As already stated the quality of the available water also needs to be considered. According to Salvato (1976:28)", the quality must be such that at all times safe and acceptable water can be supplied for all domestic purposes. If the water that is provided is not of good quality, the community risks water-borne disease (those spread through water supplies) such as cholera and typhoid. The outbreak of typhoid at Mansa National service Camp in 1976 is a good example of this. It occurred due to lack of care that is necessary as a routine for water supplies. The table below shows the relationship between water supply and diarrhoea morbidity.

Table 2: Typical effects of improved water supply on diarrhoea morbidity

Condition	Median reduction on diarrhoea morbidity morbidity (percent)
Improved water quality	16
Improved water availability	25
Improved water quality and availability	37

Source: Sinnatamby (1990:131)

The above table shows that an improvement in the quality and availability of water helps reduce the percentage of people with diarrhoea disease. When only the quality of water is improved a reduction of sixteen percent takes place in the occurrence of diarrhoea diseases and when there is an improvement in the availability of water only the occurrence of diarrhoea diseases is reduced by twenty five percent. An improvement in both the quality and availability of water reduces the occurrence of diarrhoea diseases by thirty seven percent. This shows that there is need to have an improvement in both the quality and quantity of a water supply in order to have the greatest reduction on diarrhoea morbidity.

2.4.2. Zambian Experience

George Compound in Lusaka is one of the squatter settlements that has been upgraded. Schlyter (1981:30) states that "given Squatter Settlements and their growth, Squatter upgrading was regarded by many as an emerging measure to meet the threat of cholera, typhoid and plague". The upgrading project included piped water as one of its main components. Before this project was embarked on, the water pressure for many standpipes was low and periodically many of them dried up. The upgrading project saw the provision of standpipes at a density of approximately twenty five house per unit. This is considered to be a good improvement when compared with the previous situation in which many households had to cover between two hundred and three hundred and fifty metres to reach the nearest standpipe (Schlyter 1981). The reduction in the distance from the houses to the standpipe means the households' consumption is more than it was previously.

2.5 Sewage Disposal

The art of collecting, treating and disposing of sewage is called sewage. Sewage disposal is applied to the act of getting rid of sewage by any method and this may be done with or without previous treatment of sewage. All homes should have sanitary means of sewage disposal in order to safe guard health and for convenience. ILO/JASPA (1981:106) say that "the problem of sewage disposal is much more important in urban areas and it is squatter and low cost housing areas which are worse off". There is need to pay special attention to such areas because the present situation is deteriorating and endangering the people's health. Not only are more pit latrines needed in such areas but there is need to be careful in their erection for in several areas they are so near to dwelling units that they are a source of bad health and disease.

2.5.1 Water-borne Sewerage

The water borne sewerage system is the most convenient way to deal with sewage. Sewers or pipes convey sewage from the place where it is generated to that of treatment and disposal. Though the water-borne system is the most convenient one, it is the most expensive and has a very high capital construction cost. Due to this only bigger cities in developing countries can afford the system. Only rarely is it installed in communities where there are no individual house water connections. Schaefer (1992:223) states that "if there is only a single tap in the yard of a house, there will be simply not enough water available to flush the wastes through the sewers".

The sewage system can either be a combined system or a separate system. In the former the foul sewer system is combined with storm water drainage of all

premises, including roofs and yards, also pathways and road ways and in the latter, sewage and trade wastes only are collected. This means that surface water is collected entirely by a separate storm water drainage system in a separate sewage system (Imhoff et al 1971). Today, the separate system is more favoured than the combined one. This is because the latter is quite expensive due to the large size of pipes that are used (Fair et al 1960.

2.5.2 Unsewered Disposal Systems

Individual unsewered disposal systems are also used. These systems are called on-site sanitation because the disposal of the wastes is on or near the site where they are generated. The septic tank, "aqua privies", Conservancy latrines and pit latrines are the most common types of on-site sanitation. Of the four septic tanks and pit latrines will be discussed in the proceeding paragraphs.

2.5.2.1 Septic Tanks

According to Schaefer (1992:260), "a septic tank is a water tight settling tank to which wastes from an individual household are flushed down a short sewer". This means that both the excreta and sullage for a household is conveyed to the septic tank which of course is in most cases sited just below the ground level. The tank holds the sewage for one to three days. This period allows the solids to settle to the bottom where anaerobic digestion takes place. Thick scum which forms on the surface helps to maintain the anaerobic conditions. Since sludge accumulates in the bottom part of the tank, there is need for it to be de- sludged in regular intervals of one to five years.

in order to avoid any pollution septic tanks ought to be located not less than thirty metres away from water wells and seven metres from streams and embankments. In the case of water pipes and buildings the distance should be at three and two metres respectively (McGarry 1977 and Scheafer 1992).

2.5.2.2 Pit Latrines

Apart from being the principal way of safe excreta disposal in rural areas, pit latrines are also used in the fringe areas of cities. A hole or pit in the ground with some structure on top for privacy makes up a bit latrine in its simplest form. The excreta falls in the hole and remains there. "A pit latrine can be built anywhere where the soil is not too rocky and the groundwater table not too high, and where there is no well in the immediate vicinity" (Schaefer 1992:266). The latrine can be filled with earth when about two-thirds to three-quarters full and should not be disturbed for years. This can then be replaced by a new pit (Schaefer 1992).

2.5.3 Zambian Situation

Zambian being one of the developing countries is no exception to sanitation problems that are faced by other so. The study that cheatle (1986) carried out shows that most part of Lusaka depend on septic tanks or pit latrines for their sewage disposal and only a few make use of water-borne sewerage. Pit latrines are mostly used in squatter compounds where each family has to provide its own pit latrine and see page that normally occurs is a case for concern. Therefore, in order to overcome the pollution of ground water, there is need to be careful when digging the pit latrines. Schaefer (1992:270) says that:

"As a general rule, pit latrines should not be built within fifteen to thirty metres of a well or another drinking water source. It should also be located, whenever possible downhill from a water source."

2.6 Storm Water Drainage

The surface water from rain, snow or ice melting and running off from the surface of a drainage area is what is referred to as storm water. According to Batsone et al (1989:820), "It is normally collected in sewers, and receives minimal if any treatment prior to discharge to a receiving water".

2.6.1 The Need for Storm Water Drainage

Storm water drainage is considered to be the most urgent need by many low-income communities in urban areas of developing countries in as far as urban infrastructure is concerned. This is because more than half the major cities in these countries are seaports located on coasts. A greater number of them are on river estuaries which served as commercial arteries for transportation of goods to and from the hinterland (Harpham et al 1988). "The flat estaurine terrain and soft, often impermeable alluvial soils make drainage difficult, and coastal regions of the world are where highest average rainfall is found" Cairncross and Ouano (1990:158).

Stormwater drainage must also be given high priority in arid areas. This is because, though these areas receive a low amount of rainfall, torrents of water can arise in minutes as a result of the great intensity of tropical rainfall in such areas. This is especially true in that these areas lack vegetation and adequate drainage. Rain water is not the only problem. Cairncross and Ouano (1990:158) state that:

"leaking water-mains, waste-water from washing and bathing, and sewage from overflowing septic tanks and blocked sewers constitute a health hazard and can damage buildings and cause flooding if an adequate drainage system does not exist".

The need for drainage is also significant where the ground is steeply sloping or very flat. Storm water flows fast and violently in settlements built on steep sites. This damages buildings, erodes the land and sometimes causes land slides. "Soil eroded from the hillside is usually deposited at the foot of the slope; soil eroded in a single rainstorm has been known to bury houses completely in this way" (Cairncross and Ouano 1990:159).

Stormwater drainage can help to alleviate signs of suffering such as deaths due to drowning in floods or collapsing homes (Herbert and Johnston 1982). Standing water causes a steady toll of disease, disability and death. There are a number of diseases that are related to poor drainage and malaria is one of them. Swamps, pools, puddle and streams, and stormwater canals in which there is standing water act as breeding areas for mosquitoes. Therefore, it can be said that the construction of drains is an effective mosquito control measure. This of course is considered to be an environmental improvement (Cairncross and Ouano 1990).

2.7 Solid Waste Disposal

Storm water management needs to be done hand in hand with the management of solid waste disposal as the blockage of urban drainage channels is mainly caused by the accumulation of domestic refuse. Solid wastes is "any garbage refuse, and other

discarded material, including oil, liquid, semi-solid or contained gaseous materials resulting from industrial, commercial, mining and agricultural operations and community activities" (Anderson er al 1976:343). The perception that wastes caused diseases led to the beginning of early disposal effects.

2.7.1 Solid Wastes and the Environment

Though man has always had to contend with his wastes, his congregating in cities has made waste disposal become a big environmental problem. The disposal of man's solid wastes has the greatest significance of all the environmental health problems. Wright (1956:246) says that, "the disposal of household garbage in a sanitary manner is important from a health point of view". This is because if garbage is not well handled it attracts rats and other rodents and provides breeding places for flies and sometimes mosquitoes, which are disease vectors. In sanitary collection and disposal of solid wastes adversely affects land values, constitutes public nuisance, and this contributes to the deterioration of the environment (WHO 1972).

2.7.2 Zambian Experience: Lusaka City

Solid waste disposal is said to be practically non-existent in Lusaka (WHO 1994). According to WHO (1994:6), "throughout much of the city piles of solid waste accumulate and contaminate shallow wells dug by the population in low income areas". Since only three waste disposal trucks were functioning when the WHO survey was carried out, the City Council did not have the capacity to dispose of waste. Though WHO (1994) says that solid waste disposal in Lusaka is practically non-existent, the situation is not the same today. The City Council is doing the best it can in seeing that

solid waste is disposed in the right place. For instance, there are some metal containers at the town centre where solid waste is disposed. It is quite encouraging to see the marketeers responding favourably to the Council's call for disposing waste in these containers. At one time the author had the privilege of witnessing the collection of refuse by Council workers using a tractor with trailer.

Of late there has been an improvement in the disposal of solid wastes in high density areas. Concrete enclosures have been constructed and residents throw solid wastes there. It is from these enclosures that the City Council workers collect it and dispose it at a far away place. A good example of a compound with such facilities is Kalingalinga.

CHAPTER THREE

SELECTION OF STUDY AREA AND METHODOLOGY

3.1 Introduction

This chapter considers the selection of the study area and methodology. It comprises the choice of the study area, period of data collection, pilot survey, data collection methods, the sampling procedure and data limitations.

3.2 Choice of Study Area

Before one decides on a particular place to carry out his research certain issues have to be taken into consideration. In other words it can be said that the choice of any study area is determined by certain factors. For this study, the following were the factors which contributed to the choice of Malota Compound as the study area.

1. Malota compound has a long history of sanitation problem. This is because it is one of the settlements which used to be illegal before the upgrading policy came into existence. Due to this, the municipal council never used to provide it with sanitation services and as a result the compound was an awful sight. It was picked on so as to find out how the situation is now that it is an upgraded area.

2. The time for the research somehow coincided with that for the School Teaching Practice (STP) since the researcher was to do her STP at Hillcrest Secondary School in Livingstone, she decided to choose an area which is in Livingstone. In this way it was possible to carry out the data collection whilst doing the STP.

3. Accessibility to the study area is another factor which influenced the choice. When in Livingstone, it is easy for one to get transport to Malota from the town centre. In addition to this it was possible for the researcher to walk from where she resided to Malota.

3.3 Period of Data Collection

The period in which the data was collected was seven weeks, that is, from 9th January, 1995 to 23rd February, 1995. Since the researcher was doing her STP during this period, most of the data collection was done in the afternoons except for Fridays and Sundays.

3.4 Pilot Survey

Before carrying out the actual survey of the study area, a pilot survey was conducted. This was done in order to study the spatial distribution of the in the compound. I t was also aimed at testing the reliability of the instrument used to collect data. In this case the adequacy and clarity of the questionnaire was tested. The pilot survey therefore helped the researcher to acquire some practical field work training to enable her to do actual work with a high degree of competence.

3.5 Data Collection Methods

Two of the commonly used methods of data collection were used in this study. These are the interview and observation. In the case of interviews, the schedule structured and unstructured interviews were made use of.

3.5.1 Scheduled Structured Interviews

A questionnaire was used to obtain information on sanitation from the residents of Malota. Considering the fact that some of the people in high density self-help

residential areas have not had the chance of learning how to read and write, interviews were carried out in such a way that the researcher asked the questions orally and wrote down the answers personally. This made it possible for her to have a more objective comparison of the results. These scheduled structured interviews were conducted in order to:

a) Find out problems associated with sewage and solid waste disposal.

b) Investigate the extent to which the local community is involved in alleviating problems associated with sewage and solid waste disposal.

3.5.2. Unstructured Interviews

These were held with the two resettlement officers who are in charge of the compound. This was done in order to obtain information on the government policy on sanitation. A "PUSH" organiser was also consulted for information on "PUSH" operations.

3.5.3 Observations

The researcher went round compound and took note of what she observed in as far as sanitation in Malota is concerned. The observations were made with the view of:

a) Identifying the methods of sewage and solid waste disposal.

b) Identifying the water supply system in the compound.

3.6 Sampling Procedure

Malota compound is divided into six sections, that is, Sections A to E. Sections A, C and D have ninety -eight plots one each, *1. section B has one hundred and twelve plots, Section E has seventy plots and section F has forty two plots. Altogether, there are five hundred and eighteen plots and this was used as the population. Since the compound is in sections, the stratified random sampling method was used. Due to time limitation a sample of fifty two was picked and ten per cent of the plots from each section were taken as a sample. In this case, there were ten respondents from sections A, C and D, eleven from Section B, seven from section E and four from Section F. These were randomly picked.

Table 3: Summary of the Sampling Procedure

SECTION	**NUMBER OF PLOTS**	**NUMBER OF RESPONDENTS**
A	98	10
B	112	11
C	98	10
D	98	10
E	70	7
F	42	4
TOTAL	**518**	**52**

*1. A plot in this case refers to a piece of land owned by one person. Some plot owners have built more than one house on their plots in order to rent these to those who have no houses.

Ten per cent of the plots in each section was used for a sample.

3.7. **Data Limitations**

Just as normally the case with many surveys, this also had some limitations. They are as follows:

1. The time available for the research was not sufficient and therefore limited the choice of the sample size which in this case may not be the true representation of the population.

2. Some household heads were not found at home and as a result the interviews were carried out with other members of the household more especially wives in case of households led by married men.

3. The researcher could not use water pipe maps to analyse the water supply system in the compound. This is because the Livingstone Municipal Council failed to provide these. The one which is available is too old and it was not possible to have it reprinted.

CHAPTER FOUR

4.0 DATA PRESENTATION AND DISCUSSION

The aim of this chapter is to present the findings and analyse the results of the research. This will help in coming up with a clear picture of the problems of sanitation in Malota Compound.

4.1 Methods Of Sewage And Solid Waste Disposal

4.1.1 Sewage Disposal

Through the observations made in the field if was found out that each of the 518 plots in Malota has a toilet. This means that all the people on that plot use the same toilet and it does not matter how many households or people are living on that plot.

The sewage system in the compound can be said to be divided in four subsystems. The first one serves sections E and A, the second serves Section B and C, the third serves part of Section D and the last one serves the remaining part of section D and Section F. See Figure 2

4.1.2 Solid Waste Disposal

During field observations it was discovered that people of Malota dispose the solid waste in several ways. Some people just dump the solid waste near the houses and take it to the midden boxes[1] or burn it at a later stage. Others put in old drums or sacks which are used as dustbins and are finally disposed of in midden boxes, pits[2] or take it straight to the midden boxes. Those who dispose of the solid waste directly in the midden boxes have their houses located nearer to the midden boxes than the others.

1. See plate 1.
2. See Plate 2.

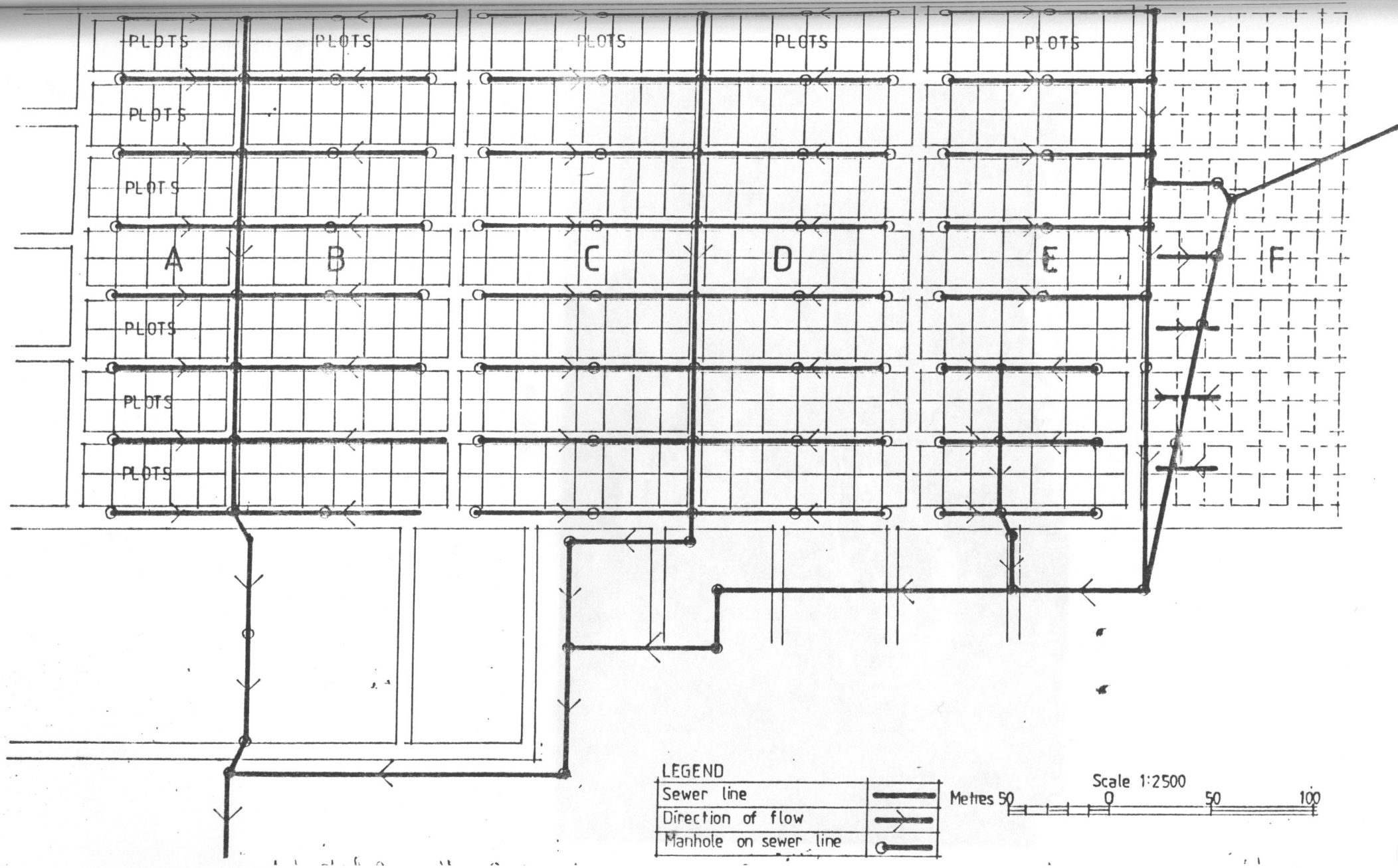

PLOTS
PLOTS
PLOTS
PLOTS
PLOTS
PLOTS
PLOTS
PLOTS
PLOTS
A
B
C
D
E
F
LEGEND
Sewer line
Direction of flow
Manhole on sewer line
Scale 1:2500
Metres 50
0
50
100

Plate 1: A Midden Box in Malota.

Plate 2: A Pit

The figure below shows how the fifty two households which were interviewed dispose of the solid waste.

Figure 3: Methods of Solid Waste Disposal

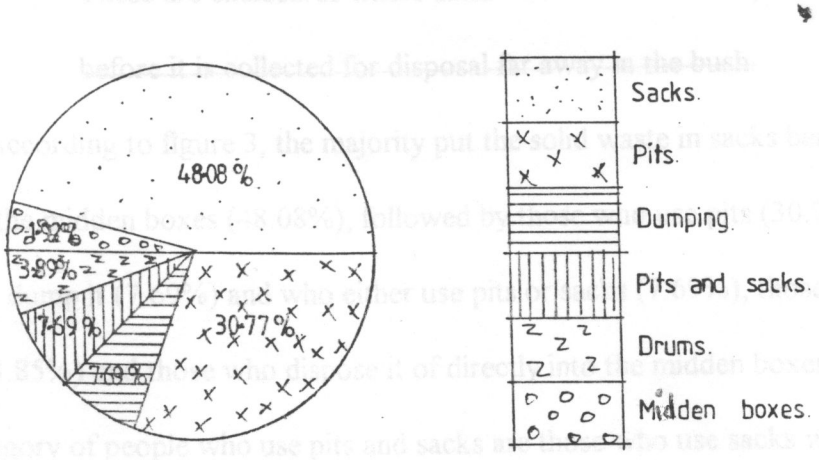


Figure 4, shows that of the 52 respondents, 15(28.85%) are on a plot where one household uses the toilet, two households, 14 (26.92%) under three households and 3 (5.77%) under four households. The highest percentage is of those who live on a plot where two households use the toilet (38.46%). This in itself shows that the situation is not conducive, to good health (there are many people who use one toilet). In this case the toilets can be said to be a communal facility on most of the plots. This is due to the fact that they have more facility on most of the plots. This is due to the fact that they have more than one household. The above situation is compounded by

the problem of water shortage which the compound is facing. When asked as to what problems of sanitation they were facing 38 out of the 52 respondents (73.08%) stated that it was water supply which of course affected, sewage disposal. The water pressure is so low that water cannot get into the toilet tanks most of the time.

~~These are enclosures where solid waste from the compound is stored before it is collected for disposal far away in the bush.~~

According to figure 3, the majority put the solid waste in sacks before taking them to the midden boxes (48.08%), followed by those who use pits (30.77%) those who just dump it (7.69%) and who either use pits or sacks (7.69%), those who use drums (3.85%) and those who dispose it of directly into the midden boxes (1.92%). The category of people who use pits and sacks are those who use sacks when they are not able to dig a pit. They said that they do not see it fit to have a pit dug during the rainy season because water can collect in them and this can encourage the breeding of insects like mosquitoes which are water related insect vectors. The percentage of those who dispose of the solid waste by taking it straight to midden boxes is the lowest because only those whose plots are nearer to the midden boxes do so.

4.2 Problems Associated With Sewage And Solid Waste Disposal.

4.2.1 Sewage Disposal

Though each plot in Malota Compound has a toilet, it does not mean only one household uses it. Several households are at times found on one plot and this therefore means that there are many people who use one toilet. The average number of houses

1. See Plate 3.

Plate 3: A Rubbish Heap.

on each plot is two. Some houses are demarcated and do accommodate as many as four households. All the plots are of the same size.

Figure 4: Number of Households using the toilet on the plot

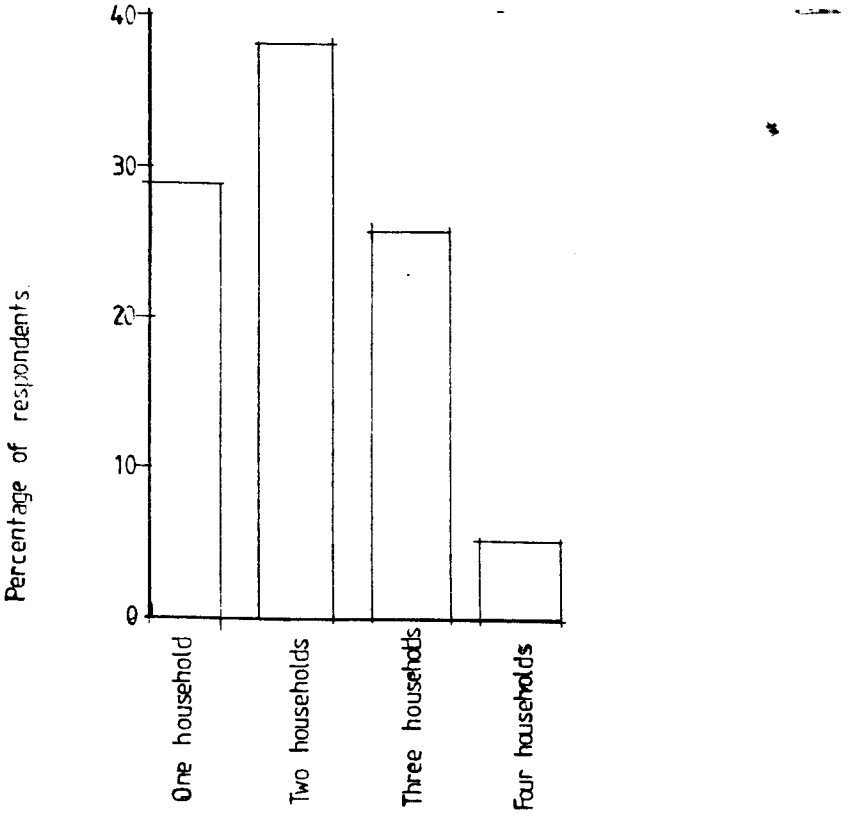


Figure 4, shows that of the 52 respondents, 15 (28.85%) are on a plot where one household uses the toilet, two households, 14 (26.92%) under three household and 3 (5.77%) under four households. The highest percentage is of those who live on a plot where two households use the toilet (38.46%). This in itself shows that the situation is not conducive, to good health (there are many people who use one toilet). In this case the toilets can be said to be a communal facility on most of the plots. This is due to the fact that they have more than one household.

The above situation is compounded by the problem of water shortage which the compound is facing. When asked as to what problems of sanitation they were facing 38 out of the 52 respondents (73.08%) stated that it was water supply which of course affected, sewage disposal. The water pressure is so low that water cannot get into the toilet tanks most of the time.

The fact that 73.08% of the households interviewed experience problems in the water supply means that it is difficult for toilets to be kept clean. Such a situation is conducive for the breeding of houseflies which contribute to the outbreak of diarrhoea diseases. This of course is proved by the fact by the fact that of the fifty two households which were interviewed thirty three (64.46%) had a diarrhoea case during the past six months (at the time of data collection) (34.62%) did not have any diarrhoea case whilst one (1.92%) was not sure if at all there was a diarrhoea case during that period.

4.2.2 Solid Waste

Solid wastes are a potential risk to human health. The main risks to health are of course indirect and arise from the breeding of house files. This is especially true when solid wastes are disposed near dwellings and therefore makes the disease vectors, flies in this case, to have a only a short way to reach humans.

The research revealed that 98.08% (figure 3) of the households which were interviewed dispose of solid wastes in drums, pits, sacks or just dump it within the yard. These are close to the dwelling units and therefore contribute to the health problems faced by the residents of Malota. As stated in the section dealing with

sewage disposal of the 52 households which were interviewed, 33 recorded a diarrhoea case, 18 did not record any whilst 1 was not sure if at all there was any case during that period.

During the interviews it was discovered that the households had complaints about the methods of solid wastes disposal which they practical. Those who dug pits said that the digging of pits was becoming a problem in that a big proportion of the space around the dwelling units had been dug previously and wonder as what to will happen in the near future. Those who used sacks complained that the sacks they used were not long lasting. They wished they could have dustbins to use for storing the solid wastes prior to their collection . Dust bins can be covered and as a result prevent a bad smell from reaching people whereas it is not the case when sacks are used.

4.3 Water Supply System In Livingstone

A water supply system generally comprises the water source(s), water treatment facilities, water transmission, service reservoir(s) and water distribution. Though this is the case these will not be addressed to in detail because it is beyond the scope of the study.

4.3.1 The Water Source

The Zambezi river which runs from the west of the town southwards towards the Victoria Falls is the source of water supply for Livingstone town, where Malota is located of course. Water is pumped from the east bank of the river which is approximately five and half kilometres south of the town (Hachi(eka 1989).

4.3.2 Water Treatment Facilities

The treatment works is composed of two plants which are somehow integrated. The old treatment plant was built in three stages, that is, sedimentation and flocculation, clariflocculation and filtration and the accelerator and filters in 1948, 1952 and 1961 respectively. The new plant which is an extension of the old one began operating in 1988. This modern treatment plant is totally automated for all dosage processes. (ASCO 1987).

During the treatment process in the old plant a dosage of aluminium sulphate is used to pre-treat the raw water from the Zambezi river. In order to soften water, lime is also added at this stage.

After the pre-treatment stage, the water passes through an accelerator (20m in diameter) or a flocculator (22.9m in diameter). The two work in parallel.

After passing through the accelerator and flocuculator, the water is passed into gravity and fitter. Filtration is in water is chlorinated and finally stored within the treatment works. At this point in time, it is worth mentioning that water in this plant is not treated daily which is an unfortunate state.

The new plant has laboratory facilities where chemists are about to carry out chemical analyses in order to decide the chemical dosage needed which of course depends on the raw water quality. The chemical dosage needed which of course depends on the raw water quality. The chemical analyses also help to find out if the quality of the treated water is in line with the World Health Organisation (WHO)

standards. Not all the equipment that is needed to carry out the necessary quality tests is available.

Water from both the new and old plant mixes in the reservoirs. This of course makes the water not to be of good quality, that is , considering the fact that treatment is not properly done in the old treatment plant.

4.3.3 Storage and Distribution

The water works has seven separate reservoirs which are in t. categories, that is, three small ones and four big ones. The total storage capacity is 32.4ml/day at a lee of about 975m above sea level.

In as far as the water distribution of the town is concerned, two distant areas are identified. They are the high and low level zones. The former are supplied from an elevated water tower whilst the latter are supplied directly from the treatment works reservoirs. The distribution network system was not designed with plan for future developments and as a result numerous linear pipe network have been connected with latter developments in the town (ASCO 1987).

Many parts of the supply system have a water pressure of less than 15 metres. Actually, the pressure level in the reservoirs at the treatment plant is just about 14-18 metres. The low pressure and linear nature of the distribution network contributes to the water supply shortages in some parts of the town (ASCO 1987).

4.3.4 Water Supply Situation in Malota

The observations that were made in the field enabled the reservoir to identify how the compound got is water. Each plot has a tap where all the people on that plot

get water. Though each plot has a tap, not all of them supply water at all times. Table 4 shows this.

Table 4: Availability of Water per plot

NUMBER OF HOURS PER DAY	NUMBER OF HOUSEHOLDS	PERCENTAGE OF THE TOTAL
0	2	3.85
1 - 8	22	42.30
9 - 16	26	50
17 - 24	2	3.85
TOTAL	52	100.0

From the above table its possible to note that only 3.38% of the household which were interviewed had water coming out of the taps for more than 16 hours, 92.30% had water within the range of 1 - 16 hours and 3.85% did not completely have water coming out of the taps. This means that Malota Compound just like most compounds in the country experiences a water shortage. This can be attributed to the low water pressure and location of the plots. Those plots which are on low level do have water for more hours than those on a high level. This of course gives us the reason as to why out of the 52 households which were interviewed 2(3.85%) had water throughout the day.

When asked as to whether there has been an outbreak of a disease or diseases in the compound thirty two respondents (61.54%) agreed while ten refused (19.23%) and another ten were not sure (19.23%). The names of diseases which were mentioned were those that are water-related. These water-related diseases were either water-borne or water-washed. Out of the thirty two respondents who agreed that there has been an outbreak of diseases, 30 (93.75%) mentioned water washed infections, since these are due to lack of water for personal hygiene, the situation shows that there is need to provide the compound with greater volumes of water.

4.4 Community Participation In Solving Problems Associated With Sewage And Solid Waste Disposal

For any programme or project to succeed there is need for local participation. Therefore, it is also important people to be involved in the provision of services such as sanitation and other basic services. In Malota Compound, the people are doing something to help in alleviating the problems that are being experienced in the areas of sanitation. Of the fifty two respondents who were interviewed, forty nine agreed that the community is involved in alleviating the problems that are being experienced in the area of sanitation, two were not sure and one refused the local community's participation (see Table 5).

Table 5: Community Participation In Alleviating Problems Of Sanitation

RESPONSE GIVEN	NUMBER OF RESPONDENTS	PERCENTAGE OF TOTAL
Yes	49	94.23
Not sure	2	3.85
No	1	1.92
TOTAL	52	100.0

When asked as to what exactly was being done the following activities were mentioned.

a. Unblocking sewers

b. Repairing toilets

c. Collecting garbage from the compound and disposing it of far from the compound

d. Digging drains

e. Cleaning drains

All the respondents who agreed that the community was involved in solving problems associated with sewage and solid waste disposal affirmed that PUSH (II) organiser were involved in organising the Local Community. This programme is being funded by the British Overseas Development Agency.

The discussion held with one of the PUSH organisers revealed that PUSH recruited a work force of four hundred and fifty. About seventy five percent of the work force are reported to be women. When PUSH began its operations in Malota, not many people were willing to help in alleviating the problems that were being experienced in the four major areas of sanitation (water supply, rainwater drainage, solid waste disposal and excreta disposal). It is only when they saw the few who were first employed getting their ration (25Kg of mealie-meal, 750ml of cooking oil, 2kg of sugar and 1kg of beans) that many were willing to be involved in the programme. This reveals that most of those involved in the programme are doing so because of the ration that they are receiving. This in itself is a problem because once the Donor Agency stops pumping in the money, the compound will go back to its original state (before the PUSH programme). There will not be anyone to remove the refuse which collects in the drainage channels or unblock the sewers whenever there is a blockage.

Though the above is the case, the interviews held with the fifty two respondents show that the individuals are doing something to alleviate the problems that they are experiencing in the four major areas of sanitation under discussion. When asked what the role of an individual should be in as far as sanitation is concerned, the following answers were given.

a. Disposing garbage at the right place.

b. Burning the refuse in the pit after sometime.

c. Using drums for disposing refuse in place of dustbins which are too expensive for them to buy.

d. Boiling drinking water.

e. Repairing leaking taps and broken sewers.

f. Not using hard material in the toilet.

g. Pouring water in the toilet tank if it cannot reach the tank in order to flush the excreta disposed of in the toilet.

h. Digging drains in places where rain water stagnates or putting small stones or sand there.

The figure below shows the responses classified under drainage, sewage disposal, solid wastes disposal and water supply.

Figure 5: The Involvement Of An Individual In Sanitation Issues

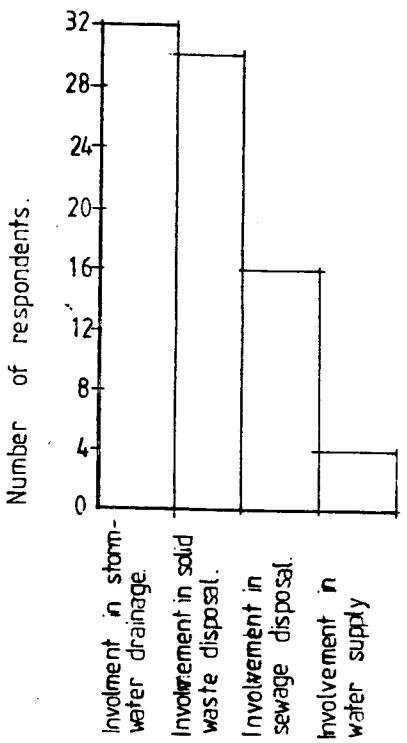


Figure 3 shows that thirty two respondents (61.54%) mentioned drainage as an area in which an individual can be involved in alleviating the problems of sanitation, thirty (57.69%) mentioned solid wastes disposal, sixteen (30.77%) mentioned sewerage disposal and four (7.69%) mentioned water supply.

Asked as to whether they were doing the activities which they mentioned as a way of alleviating problems of sanitation, thirty nine respondents (75%) gave a yes response whilst thirteen (25%) gave a no response.

THE GOVERNMENT POLICY ON SANITATION IN UPGRADED AREAS

In order to assess the effectiveness of the government policy on sanitation in upgraded areas, the National Development Plans (NDPs) were made use of. Apart from the NDPs, the books; Zambia: Basic needs in an economy under pressure and narrowing the gap wee used. In addition to consulting the above literature, the discussion held with the two Resettlement Officers in Charge of Malota Compound who are officials at Livingstone Municipal Council were of good use in assessing the effectiveness of the government policy on sanitation in upgraded areas.

The Second National Development Plan

The issue of sanitation in this NDP is made mention of under the section for Housing and Real Estate. In referring to the upgrading of unauthorised settlements, the plan gave first priority to the acquisition of land. It further on stated that "the following services must be provided in any upgrading exercise: piped water supplies, sewers and sewage disposal, roads and surface water drainage and other communal services" (GRZ 1972:148). This means that the government's stand is to provide sanitation services to upgraded areas.

The Third National Development Plan

The plan gives attention to water supply and has as its target the provision of safe water supply to all inhabitants by the year 2000. The strategies put forward include the improvement and expansion of existing water supply facilities, coming up with a National Master Plan which would form up a better basis of exploitation and having more trained water engineer and technicians needed for efficient and efficient management of water resources. The plan also states that "the provision of water and sanitation is the responsibility of District Councils" (GRZ 1989:286). Lack of funds is given as an excuse for the Councils' facilitate to provide such services adequately.

ILO (1977) and ILO/JASPA (1981) do put the issue of sanitation into consideration. A private water tap or communal piped water points which are within a reasonable distance to be shared by few families are considered as minimum standards for water supply in Urban areas. A good pit latrine is taken to be an adequate solution to the sewage problem. this means that a household with a pit latrine meets the minimum need.

Having examined the above mentioned documents, it can be said that very little attention has been paid to the improvement of sanitation facilities and they have in most cases been treated more as part of the general housing situation (ILO/JASPA 981). This situation implies that the Zambian government lacks a coherent sanitation policy. This situation could be as a result of the fact that the water and sanitation sector in Zambia is in disarray. There is a great variety of players and no lead agency taking the responsibility of policy definition, strategy development or implementation

of programmes. The other problems which the sector has been facing are financial unsustainability, lack of adequate well trained human resources and lack of cost recovery at community level. The lack of a coherent policy on sanitation and the absence of a lead agency in the sector has resulted in the government's inability to ensure that sanitation is properly addressed in donor funded programmes which of course could have helped in improving urban sanitation.

Though the issue of sanitation was addressed to in the plans one is able to note that though plans were put down, implementation was not carried out. A good example is that of the aspect of water supply. In the Third National Development Plan, it was proposed that the National Water Authority be created to operate and manage water supply and sewerage in the country, but this was not done. Actually a number of studies regarding the improvement of the sector were undertaken but unfortunately the recommendations made for sector improvements were not implemented.

Once an area has been upgraded, it the responsibility of respective Municipal Council to provide to with sanitation services. The situation in Malota Compound reveals the fact that the Municipal Council provided the compound with the sanitation infrastructure and indeed offered the services accordingly just after the upgrading programme. Today, the Municipal Council is not able to maintain the sanitation facilities in the compound and the community is being assisted by the PUSH project. Discussions with the Resettlement Officers in Malota revealed that the Council lacks money to maintain the sanitation infrastructure in good condition.

From the interviews that were held with the residents of Malota it was found out that the Council was not actively involved in alleviating the problems which people face in the sector of sanitation. Of the fifty two respondents, forty seven said that the Council was not doing anything, four said it was doing a little and left most of the work to the PUSH programme and only one was not sure of what was happening. This situation shows that the issue of sanitation in upgraded areas is neglected. The government is not providing the sanitation services in an efficient manner. This, of course, can be attributed to the lack of a coherent sanitation policy lack of money and lack of cost recovery at community level.

It seems that the local community is expecting too much from the government. Below are the things which the respondents considered to be what the Council is supposed to do in order to help alleviate the problems faced in sanitation.

a. Take an active part in maintaining the sewage system.

b. Pump in more money for sanitation services.

c. Construct new water pipes bigger than the present ones which are old in order to provide the compound with enough water.

d. Treat the water properly.

e. Overhaul all the sewers and embark on projects to help in the area of sanitation.

f. Unblocking the sewers and also provide big sized ones.

g. Collecting garbage.

h. Repairing taps and toilets.

I. Provide dust bins and a vehicle to collect garbage.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

The purpose of this chapter is two fold. Firstly, it summarises the major findings of the study and secondly, it provides recommendations on what should be done to alleviate the problems of sanitation in high density self-help residential areas.

5.1. Conclusion

Malota compound has a population of slightly about 10,000 people and this has resulted into many people living on one plot. Each plot has one toilet and all people on that plot share that toilet. Since most of the plots do not have water throughout the day, it is not easy to keep the toilets lean. This situation poses a risk to the health of the people and contributes to the high occurrence of diarrhoea in the compound. The inadequacy of the water supply is also manifested in the outbreak of water-washed diseases such as dysentery and scabies.

Residents of Malota dispose of the wastes by using midden boxes or pits. Those who use the former first put the waste in either old drums or sacks before taking it to the midden boxes. The group which uses pits bury the pits when they are full. PUSH workers collect the solid waste from the midden boxes and dispose of it far from the compound. The use of pits and sacks does pose a risk to people 's health in that these are located near the dwelling units. They in most cases act as breeding places for disease vectors such as cockroaches and houseflies which easily find their way to humans. Being an upgraded squatter settlement, Malota compound qualifies to be provided with normal urban services and utilities as stated in the Second National Development Plan. Unfortunately, due to financial constraints, the

Lvingstone Municipal Council is not able to maintain infrastructure such as sewers and water pipes. The PUSH II programme is currently helping in alleviating the problems of sanitation which people in Malota face. The residents who are involved in the programme get a ration of 25kg of mealie meal, 750ml of cooking oil, 2 kg of sugar and 1kg of beans. Some of the activities which are carried out are unblocking sewers, digging drains and collecting garbage from the compound. This has helped in making Malota a better place than it was previously.

It was found out that the Malota residents who are helping in alleviating the problems of sanitation in the compound under the PUSH programme are doing so because of the ration which they get. This implies that once the Donor Agency stops funding the PUSH Project the people who are involved in the Project will withdraw their labour. In this case the refuse which collects in the drainage channels will not be removed, the broken sewers will take ages to be repaired and the streets in the compound will be full of refuse.

5.2. Recommendations

Having considered the problems of sanitation in high density self-help residential areas in this study, the following recommendations can be made.

1. The failure rate of sanitation systems in the country calls for the government to pay more attention to the operation and maintenance procedures during planning and design stages.

2. The Government must give a high priority to investment in sanitation. In addition to this, there is need for the extension of effective sanitation services to lower income groups which have been largely ignored.

3. Professionals in Public Health must be actively involved in promoting improvements in sanitation. In addition to this, they should help in raising awareness amongst users and providers of the links between inadequate sanitation and disease.

4. A coherent policy on sanitation must be formulated. Once this is in place, the Government should be able to properly address the sanitation issue in donor funded programmes. Above all, it should lift up the profile of sanitation with principal donors and seek support for improvements in urban sanitation.

5. The government should make sure that each time some donor agencies are ready to help in alleviating problems of sanitation, the approach that is taken for community participation must be a sustainable one. It should be one that will see the community being involved in alleviating its problems even after the donors have long gone. The residents should participate for the sake of making their environment a better place to live in and not just for the sake of the returns which they get in form of food.

APPENDIX

BIBLIOGRAPHY

AFRICAN STATES CONSULTATION ORGANISATION (1987). Reconnaissance study for Livingstone water supply and sewerage system, Lusaka

AMERICAN FRIENDS SERVICE COMMITTEE (1975). Chawama self-help Project Kafue, Zambia. AFSC, Philadephia.

Anderson Fetal (1976) solid waste disposal. Meriil Publishing Company, Columbus

BATSONE R etal (1989). The Safe disposal of hazardous wastes. The World Bank, Washington DC.

BOYDELL R.A(1984). " Feasibility study for a sanitation project, Mongu Township, Western Province, Zambia" in GRZ(1984), Report on Conference of Zambia International Drinking Water Supply and Sanitation. National Committee for IDWSSD, Lusaka.

CAIRNCROSS S. and E.A.R. OUANO(1990)."Surface water Drainage in Urban Areas" In HARDOY J.E. et al (1990). The poor die young: Housing and health in third world cities. Earthscan Publications Limited, London.

CHEATLE M.E. (1986) "Water supply, Sewerage and Drainage "in WILLIAM G.J.(1986) Lusaka and its Environs . The Zambia Geographical Association, Lusaka.

CARRUTHERS I.D.(1973). Impact and Economics of community water supply: A study of Rural Water Investment in Kenya. Agrarian Development Unit, Nairobi.

CHISALA S(1994) " Sanitation in Urban Areas" in Paper presented at a workshop for Urban Sanitation Improvements. Department of Water Affairs, Lusaka.

CLINARD M.B. (1966). Slums and community Development. The Free Press, New York.

FAIR et al (1966).Water and Waste Water Engineering. John Wiley and sons Inc., New York.

FRANCEYS et al (1992). A guide to the development of on-site sanitation. WHO, Geneva.

GRZ (1966). The first National Development Plan. NCPD, Lusaka.

GRZ (1972) a. Ministry of Health Annual Report for year 1968. Government Printers, Lusaka.

- GRZ (1972)b. The Second National Development Plan. NCDP, Lusaka.

- GRZ (1979) The Third National Development Plan. NCPD, Lusaka.

- GRZ (1989) The Fourth National Development Plan. NCPD, Lusaka

HARPHAM T. et al (1988). In the shadow of the city : community Health and the Urban Poor. Oxford University Press, New York.

HERBERT and JOHNSTON (1982). Geography and the Urban Environment. John Wiley and Sons, New York.

IMHOFF Ket al (1971). Disposal of sewage and other water-borne wastes. Butterworths, London.

ILO/JASPA (1981). Basic Needs in an Economy under Pressure. International Labour Office, Addis Ababa.

JONES N.H (1975). The Scientific background of the International Sanitary Conferences 1851-1938. WHO, Geneva.

LUNDGRENT et al (1961). Kapwepwe Compound: A study of an authorised settlement. University of Lund, Sweden.

MARTIN R. (1975). " Urbanization, Squatter Settlements and Upgrading in Unauthorised Settlement in Zambia, National Housing Authority, Lusaka.

MASON A.L. (1980). Evaluating Squatter Resource Residence in Urban Zambia: Effects of social class and urbanisation (MA Thesis). Michigan State University, Michagan.

Mc. GARRY M.G. (1977). " Waste Collection in Hot Climates: A Technical and Economical Appraisal " in FEACHEM R et al. (1977). Water, wastes and Health in Hot Climates. John Wiley and Sons, New York.

MUTIZWA - MANGIZA N.D (1988). Rural Water Supply and Sanitation in Zimbabwe: Recent Policy Development, University of Zimbabwe, Harare.

OKEDYI F.O.(1972). "Public Health and Nigeria's National Development Plan" in OMINDE S.H and C.N. EJIOGU (1972). Population Growth and Economic Development in Africa. Heiizemann Limited, Nairobi.

PAYNE R. (1982). Drainage and Sanitation. Construction Press, New York

PICKFORD J. (1977)."Solids in that Hot Climates" in FEACHEM R. et al (1977). : water, waste and Health in Hot climate. John Wiley and Sons, New York.

SALVATO J.A. (1976). Guide to Sanitation in Tourist Establishment. WHO, Geneva

SCHAEFER W. (1992) Public Health Engineering. UNZA, Lusaka.

SCHLYTER A and T. SCHYTER (1979). George - The Development of a Squatter settlement in Lusaka, Zambia. Swedish council for Building Research, Stockholm.

SCHLYTER A (1981). " Upgraded George revisited" in RAKODI and A. SCHLYTER (1981). Upgrading in Lusaka: Participation and Physical Cahanges. Swedish council for Building Research, Stockholm.

SINNATAMBY G. (1990). "Low Cost Sanitation" in HAYDOY J.E et al (1990), The Poor die young. Earth scam publications Limited, London.

WHO (1972). Health Hazard of Human Environment. WHO, Geneva.

- (1987). a. Improving Environmental Health Conditions in Low Income settlements, WHO offset Publication No. 110. WHO, Geneva.
- (1987) b. Technology for water supply and sanitation in Developing countries, Technical Report Series 742. who, Geneva.
- (1994). Urban Sanitation in Zambia: Mission Report. Ministry of Health Common Wealth Secretarial. WHO, Geneva.

WRIGHT F.B. (19560. Rural water supply and sanitation. Chapman and Hall Limited, London.

QUESTIONNAIRE FOR MALOTA RESIDENTS

SECTION A: BACKGROUND INFORMATION

1. Sex: Male _____ Female _____

2. Marital Status: Married _____ Single _____

Widow/Widower_____

Divorcee_____

Other (Specify)_____

3. Household Size:_____

4. Occupation: _____

5. Education Attainment:

Not been to school _____

Completed primary _____

Completed secondary _____

Higher Education (specify) _____

SECTION B: SANITATION INFORMATION

WATER SUPPLY

1. Approximately, how many hours in a day are you supplied with water?

_____

SOLID WASTE DISPOSAL

2. How do you dispose solid wastes?_____

3. How do you dispose sullage?_____

SEWAGE DISPOSAL

4. What is the average number of people who use your toilet?

_____

5. Has any family member have had diarrhoea in the past six months?_____

6. Any other diseases (specify)_____

7. What could be the causes (s) of these diseases?_____

8. Do all the family members wash their hands after using the toilet?

_____

9. What problems of sanitation are you facing?_____

SECTION C: GENERAL INFORMATION

1. Is the community helping in any way to alleviate the problems that are being experienced in the area of Sanitation?

_____

2. What exactly is being done?

_____

3. Who funds the programme?

_____

4. What is the Municipal Council; or Government doing in order to alleviate the problems of sanitation in Malota?

_____

5. In your opinion, what should be its role in reducing the problem?

_____

6. Have you ever had an outbreak of any diseases in the Compound?

_____

7. If yes, name the diseases._____

8. What do you think was the possible cause of the disease(s) ?

_____

9. What should be the role of an individual in as far as sanitation is concerned?

_____

10. Are you doing it ?_____

11. What do you think about environmental education?

_____

THANK YOU!