

**THE EFFECTS OF INFORMAL SETTLEMENTS ON
ENVIRONMENTAL MANAGEMENT IN TEMEKE
MUNICIPALITY**

By

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**A Dissertation Submitted in Partial Fulfilment of the Requirements for the
Degree of Master of Science in Environmental Management (MSc. EM) of
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2013

CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a dissertation entitled “**The Effects of Informal Settlements on Environmental Management in Temeke Municipality**”, in partial fulfilment for award of the Degree of Master of Science in Environmental Management of Mzumbe University.

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DECLARATION

I, **Evaristo Benitho Mwamhanga**, declare to Mzumbe University that dissertation titled “**The Effects of Informal Settlements on Environmental Management in Temeke Municipality**” is my own original work and that it has not been presented and will not be presented to any other university in a similar or any other degree award.

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DEDICATION

This work is dedicated to my uncle, Melkior Mathew Mbwagai who contributed to my well-being through love, respect, moral and financial support which enabled me to accomplish this level of education. I really appreciate, may almighty God bless you.

ABBREVIATIONS

CIDA	Canada International Development Agency
CIUP	Community Infrastructure Upgrading Programme
EPM	Environmental Planning and Management
HFP	Housing Finance Project
IDS	Institute of Development Studies
MU	Mzumbe University
NGOs	Non Government Organizations
PMO	Prime Minister's Office
SCP	Sustainable Cities Programme
TMC	Temeke Municipal Council
UN	United Nations
UNCHS	United Nations Conference on Human Settlements
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNHH	United Nations Human Habitat
URT	United Republic of Tanzania
WB	World Bank
WHO	World Health Organization

ABSTRACT

This study examined the effects of informal settlements on environmental management. Specifically, it aimed at identification of the socioeconomic effects of informal settlements on environmental management, examination of community role in environmental management in informal settlements and determination on the strategies that will improve environmental management in the study area.

The study was conducted in Temeke Municipality and Keko ward in particular. Primary data were collected through structured questionnaires while secondary data were collected through interview. The study involved 102 respondents in which 95 were household respondents and 7 were key informants. Data collected were subjected to the Statistical Package for Social Science (SPSS), multiple response and Chi-square for analysis.

The study findings revealed that, socioeconomic effects of informal settlements have contributed negatively to environmental management. It was found that community role was ineffective to manage environments in informal settlements. It was further disclosed that environmental education, provision of environmental infrastructure and implementation of bylaws were found to be appropriate strategies for better environmental management in Temeke Municipality.

Based on the study findings, it is concluded that, the Temeke Municipality Council should prepare an effective municipal environmental policy to address environmental problems occurring in informal settlements. Strategies such as provision of environmental education, public and private sector partnership creation of dumping sites and adequate supply of facilities for environmental management through clearly organized programmes, plans and projects should be used to improve the sustainability of environmental resources at the household, Streets and Ward with an emphasis of reversing the negative effect of informal settlements on environmental resources. Finally, areas including environmental education and community participation in environmental management were suggested for further studies.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The world state of settlements shows that more than 50 percent of people live in informal settlement especially in cities of developing countries with the expanding population due to rural-urban migration and natural birth rate (UN-Habitat, 2005). African countries are facing serious situation of informal settlements, about 70 percent of the African population is living in informal settlements (Lupala, 2002). Informal settlements are growing in three ways; in number, in areas and in a population with a growth rate of 4 to 7 percent per year in Sub-Saharan Africa (Kombe & Kreibich, 2007). The informal settlements in post-industrial countries are expanding in the area because of growing affluence, in Africa the increasing demand for urban space is determined by population growth and rural urban migration (UN-Habitat, 2005). One reason for this migration is prospect those cities offer. It is observed that young people from rural areas see no future in their home villages and move to agglomerations for seeking possibilities of getting employment, education and access to social infrastructure, consequently, limiting the attempts taken by development actors to improve environmental management in cities of developing countries.

According to Lupala (2002), informal settlements are a common feature in cities of developing countries, especially, in Sub-Saharan Africa. They are typically the product of the socioeconomic need for shelter by the urban low income earners. Inhabitants of informal settlements live in a permanent state of illegal and social insecurity that lack legal recognition due to unlawful occupation and or unauthorized use of land and or illegal construction of houses upon the land (URT, 2004). Informality is associated with the term illegality; however, references to illegality in human settlements refer mainly to conformity with the planning and construction norms, and more importantly to tenure situations (Durand, 2006).

Tanzania is one of the countries in Sub-Saharan Africa with the highest proportion of its urban population lives in informal settlements, the proportion ranged between 50 to 80 percent of the whole urban settlement (Kombe, 2005). In this country, the highest demand for housing, jobs, land for building purpose and services combined with the inability of the administration to provide the settlers with the same induce the people to be driven to growing of informal settlements. For example, about 70 percent of the Dar es Salaam population lives in informal settlements (Kombe & Kreibich, 2007). The structure of their settlements is characterized by a nonfunctional planned pattern or unconventional planning principles. This entails that there is either no or almost no guided planning for their streets and technical infrastructures which pose great problems on environmental management (Kombe, 2005).

The dysfunctional settlement pattern and high density of houses lead to insufficient provision of space for streets as a result, accessibility to houses is blocked. This is also stressed by the fact that settling processes at an early stage of development are done individually which contribute to the creation of a random settlement pattern. The evolving organic urban forms and their associated land use structure of cities in Tanzania are not in compliance with normative urban land development concepts and standards. These irregularly evolved urban forms house a number of problems, for instance, insufficient land use distribution, land degradation, development pattern of health threats as the density of settlements increase of the landscape (Kombe, 2010).

According to Kironde (2006), in Dar es Salaam, informal settlements is the prime option for the land seekers where the public sector fails to manage urban growth according to its legal norms and the expectation of citizen which fuel the rapid growth of informal settlements. The city is found in the highly urbanizing region of East Africa with projected population of 5.7 million in 2010 and it is expected to double in 2025. This rapid urbanization has already started to generate environmental problems which need urgent response (UN-HABITAT, 2008).

In Temeke Municipality and Keko ward in particular, unplanned settlement is associated with an increasing of population growth, most of the people migrated from other parts of municipalities and countrywide to utilize social and economic opportunities (Kombe & Kreibich, 2007). As population increases, the informal settlements grow and contribute to destruction of physical infrastructure such as sewage systems, leading to poor waste disposal and management which in turn decreasing environmental quality (Mwandosya & Meena, 2005).

1.2 Statement of the Problem

Debate on informal settlements has been a centre of concern for many researchers mostly addressing issues related to the adequate provision of public infrastructure in informal settlements (United Nations-Habitat, 2006a). In their findings, researchers have linked the problems of informal settlements with inadequate provision of public infrastructures, including water supply and sewage systems (Srivves, 2010 ; World Bank, 2010).

Development actors that include the World Bank and United Nations Human Habitat have formulated and implemented various strategies, programmes and projects such as Community Infrastructure Upgrading and Environmental Planning and Management, both aiming at improving the capacity of the City Council and Municipalities to plan, coordinate and manage urban development (Kombe, 2010). There are limited initiatives taken by development actors to address the provision of services related to environmental management, particularly, controlling of pollution and degradation of air, water and land (Ndezi, 2011). Yet simultaneously, there is frequent deterioration of environmental quality to the extent that one cannot expect the environment to be sustainable for much longer. Therefore, this study examined the effects of informal settlements on environmental management.

1.3 Research Questions

- i. What were the socioeconomic effects of informal settlement in environmental management?
- ii. What were the roles of community in managing the environment in informal settlements?
- iii. What strategies should be taken to improve the environmental management in informal settlements

1.4 Research Objectives

This part covered the main and specific objectives of the study

1.4.1 General Objective

This study examined the effects of informal settlements in environmental management

1.4.2 Specific Objectives

The study focused on attaining the following objectives:-

- i. To identify the socioeconomic effects of the informal settlements in environmental management.
- ii. To examine the community roles in managing the environment in informal settlements.
- iii. To determine the strategies that should be taken to improve the environmental management in informal settlements.

1.5 Scope of the Study

The study intended to examine the effects of informal settlements on environmental management. The content of this study was to identify socioeconomic effects of informal settlements in environmental management, examining community role in managing the environment in informal settlements and to assess strategies that improve environmental management in informal settlements. The study covered a jurisdiction of Keko Ward, found in the Temeke Municipality in Dar es Salaam region. The household respondents were focused on the term of age, sex, education level and streets of residents together with key informant from govern organizations.

1.6 Significance of the Study

The study provided baseline information on the effects of informal settlements in environmental management in Temeke Municipality. It provided a lesson to the targeted population of the study area and other place facing the same problem. The study aided the researcher to integrate his class theoretical knowledge into practical application in an academic journey of improving his future career goal with respect to environmental management.

The study assisted readers in generating information related to informal settlements and environmental management as one of the literature review to those who are interested in continuing with similar study or other fields on informal settlements and environmental management.

1.7 Limitations of the Study

In the process of conducting this study there were several limitations which challenged the researcher to meet the stated study objectives, these challenges were rain season (rainfall), respondents socioeconomic activities, ready less of some of the respondents and improper data management to government officials.

Rainfall was a serious limitation which challenged the researcher during data collection. It increased transportation cost due to unexpected rainfall which occurred in the first week of data collection. This increased hardship to the researcher and his team daily data collection movement from one place to another on time by the use of public transport (*Daladala*) which was planned to be used by this study due to its affordability in relation to researcher's budget. This circumstance forced the researcher to hire a private car (tax) as a means of transport which was very expensive compared to public transport. The researcher's incurred addition cost out of the planned research budget to attain the targeted objectives on time.

Respondent's socioeconomic activities were another limitation that challenged the researcher during data collection. In this particular circumstance some of the respondents were very busy in undertaking their socioeconomic activities arranged from food vending, furniture manufacturing, waste collection and agriculture. These

activities made them demand financial rewards as a means of compensation for time spent by them with researchers in answering the research questions. Therefore, the researcher and his team opted to collect data from such types of the respondents in evening hours and weekends.

Ready less of the Respondents and Improper Data Management, this situation has attempted to limit the attainment of the study objectives. On one hand, some of the household respondents opted to answer some of the questions and escaped from answering other questions. On the other hands, some of the offices were not serious in keeping or managing the necessary information which were essentials for the study. For that reason, the researcher consulted various sources of information either hard or soft related to informal settlements and environmental management conducted by different researchers in the Ward and Temeke Municipality in order to triangulate, validate and fill the existed data collected gap from household respondents and official or key informants consulted by this study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter rod on various studies that have been undertaken by different authors on issues related to informal settlements and environmental management. Basically, the study focused on the conceptualization of terms such as informal settlements, environment and environmental management theoretical and empirical literature review, conceptual framework as well as a research gap.

2.1 Conceptual Definitions

This part presents the definitions of various terms, including informal settlements, environment and environmental management.

2.1.1 Informal Settlements

There is no universal agreement that has been reached concerning what is termed as informal settlements. Definitions of informal settlement vary widely from country to country depending on a variety of parameters such as economic, social and environmental factors. An important issue in defining informal settlement is the distinction between formality and informality, the borderline between formality and informality when applied to economic, social and environmental activities (Hoffman & Shirhan, 2006). UN Habitat (1996) added that informal settlements are the residential areas where a group of housing units have been constructed on land to which the occupants have no legal claim, or which they occupy illegally, and it is an area where housing is not complied with current planning and building regulations. According to Kombe (2005), the informal settlements refer to groups of housing in an area which are not complying with planning and building regulations.

2.1.2 Meaning of Environment

According to Domingo (2002), environment refers to complex physical, chemical and biotic factors which affect the growth of plant and animals including man. In a broader sense, the environment is the aggregate of external conditions and influences affecting the life of an organism or population, especially, man. In general, there are two types of environment, namely: natural or physical environment and cultural or social environment. In the physical environment, the surroundings are mostly naturally given, such as one who lives near the sea or shore, his/her physical environment is specifically marine environment. Cultural or social environment, the surroundings are mainly the results of the works of man. For example, those who live in the city, their environments are classified as cultural or specifically urban environments, as the city is developed as a result of the efforts of the man.

2.1.3 Environmental Management

Environmental management is the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy by which environmental health is regulated (Mwandosya & Meena, 2005). It does not involve managing the environment itself, but it is the process of taking steps and behaviours to have a positive effect on the environment. This means administrative functions that develop, implement, and monitor environmental policy or guideline of an organization in order to attain environmental quality.

2.2 Theoretical Literature Review

This section linked the study objectives with previous studies that have been conducted by different authors in considering the socioeconomic effects of informal settlements in environmental management, community role in managing the environment and strategies that improve the environment in informal settlements.

2.2.1 Socioeconomic Effect of Informal Settlements in Environmental Management

Globally, environmental management in informal settlements is affected by socioeconomic activities performed by people who are living in informal settlements which are associated with urban city. These socioeconomic activities include agriculture, furniture manufacturing, industries, trade as well as income generating activities performed by majority of low income earners such as furniture manufacturing, food vending, car wash and garages (Miltin and Satterthwate, 2004). The unsustainable development of these socioeconomic activities contributing much to pollution and environmental degradation such as water, air and land resources to a great magnitude compared to the actions taken to improve environmental sustainability in urban communities (UN-Habitat, 2008). In addition, Harris (2006) argued that mismanagement of environment in informal settlements is linked to socioeconomic effects of informal settlement growth, whereby people are involved in income generating activities and social stratification through developing a common rental housing business. This situation is increasing in urban areas in most of developing countries where people need to live closer to their working areas, thus, influencing the rapid development of informal settlements regardless its supporting infrastructure for managing environment such as waste collection, treatment and disposal as well as pollution control.

According to World Health Organization report (2006b), environmental problems that occur in informal settlements are divided into two types, namely traditional and modern hazards. Traditional hazards are associated with lack of development while modern hazards are associated with unsustainable socioeconomic development. Traditional hazards are related to poverty and insufficient development, particularly,

lack of access to safe drinking water, inadequate basic sanitation, and indoor air pollution from coal, biomass fuel and inadequate solid waste disposal. Modern hazards are related to socioeconomic development and unsustainable consumption of resources including water pollution from polluted areas, industry and intensive agriculture, outdoor air pollution, solid and hazardous waste accumulation, land degradation, and trans-boundary pollution (Milton & Satterthwaite, 2004).

Tanzania like other developing nations has massive influx of migration to urban areas due to various socioeconomic opportunities which operate in informal settlements. These include those of business, trade, water supply and electricity which influence various socioeconomic developments. This situation contributes to rapid growth of informal settlements which limit government's ability to provide services for sustainable healthy living environments. These increased the problems of deprived neighbourhoods through deteriorating infrastructure due to population growth and unsustainable pattern of human settlements which increasing environmental degradation in different magnitude to the extent that one cannot expect the environment to be sustainable for much longer (Mohapi, 2006).

Informal settlements are manifestation of legal and often social exclusion from the formally recognized urban environment (Huchzermeyer, 2008a). These are settlements that developed due to direct response of increased inward migration from rural to cities resulting in failure of the urban authorities and economies to provide adequate and affordable housing for the increasing population. As people continue to migrate to urban cities in searching for better livelihood, the housing and employment situation become more precarious, thus, resulting in further conditions associated with various formal economic activities that limiting environmental management (Abbott, 2008).

2.2.2 Community Role in Managing Environment in Informal Settlements

Kombe (2005) pinpointed out that, multifaceted problems of environmental management in informal settlements requires action of both national and local levels, the private sector and civil societies including community organizations to be involved, affordable land housing options, environmental education, basic services

and settlements infrastructures must be made available, community must plan for better settlements in respect to environmental infrastructure and be responsible in daily activities related to environmental management.

Environmental management in informal settlements could be improved by developing strategic vision through effective participation of local and national stakeholders by identifying priority issues and actions to improve housing conditions and its surrounding environment, urban services and local economy. The vision should provide a road map for developing the city over the next two decades that will enhance urban and land management through training of local authorities and community in information management, strategic urban planning, land regulations and urban administration (UN Environmental Program, 2006). Environmental management should address the political relationship between government and all citizens by redefining new effective ways of working with local communities, people's organizations, the private sectors and other stakeholders in the underpinning of modern urban municipal governance of communities should strengthen their roles because they are main agents and victims of environmental problems (Kombe, 2005).

2.2.3 Strategies that Improve Environmental Management in Informal Settlements

This part provided an overview of different strategies that improve environmental management. These strategies are upgrading of informal settlements, the flow of information, economic approach and housing finance project.

2.2.3.1 Upgrading of Informal Settlements

Informal settlements upgrading applied to any sector based intervention on the settlements that result in quantifiable improvement in the quality of life of the residents affected (Abbott, 2008). This means that there is a range of potential interventions that will play a significant role in determining the success of upgrading projects that seek to transform an illegal and sub standards environment through capital intensive intervention.

2.2.3.2 The Flow of Information

The flow of information from the residents to development actors who are concerned with informal settlements and environmental management improve technical decisions and increase resident's decision making role and participation in environmental management issues (Davis, 2007). It is, thus, important for development actors of informal settlements to regard residents as a main source of information since they are much more aware with environmental problems affecting them than anybody else outside their settlements. In this aspect, the development actors will only be able to better address the problem mentioned or discussed by residents through participatory approach which provide them maximum opportunity to take part as the main agents of environmental management.

2.2.3.3 Economic Approach

According to Domingo (2002), economic approach for managing environment come in many different forms, but generally, works by making people face the environmental costs they impose on society. Economically, this approach includes charges or mental improvements, including subsidies in environmental pre-conditions, tax and financial support. Economic incentives also include enforcement initiatives such as fines for non- compliance with regulation, legal liability for taxes. This provides economic incentives to reduce production or use of harmful subsistence which destroys the environment and, thus, contributing to environmental management.

2.2.3.4 Housing Finance Project (HFP)

It is observed by Chambi and Hanai (2009) that, in order to improve environmental management in informal settlements, governments should initiate Housing Finance Project (HFP). The HFP will develop mortgage and housing microfinance instruments as an effort to cater for different segment income distribution. Developer's access to housing finance will help to improve affordability and construction of standards, and encourages the private sector to take a greater role in the provision of housing services in respect of infrastructure for environmental management.

2.3 Empirical Literature Review

This part presents the information on various studies in respect to urban planning and environmental management, sustainable cities programme as well as environmental management and socioeconomic linkage.

2.3.1 Urban Planning and Environmental Management

A report by United Nations Habitat (2006) has revealed that Urban Planning and Settlements Planning have in most developing countries failed to provide adequate shelter option for urban poor, settlements expansion lack for behind the actual urban development and most urban expansion is unplanned and unauthorised. Often, huge informal settlements are developed in a vacant land which contributed negatively on environmental management. Furthermore, there is an intense densification process taking place in many formally built environments (Andersen *et al*, 2006).

2.3.2 United Nations Sustainable Cities Programme

United Nations Habitat and United Nations Environment Programme (UNEP) launched the Sustainable Cities Programme (SCP) in 1991. The programme entails environmental care of informal settlements in third World countries. The SCP includes a wide range of cross sectoral interventions, typically, involving in solid waste management, environmental health, water resource management, urban transport and air pollution, as well as activities specifically targeted at benefiting the urban poor.

Central to SCP there is Environmental Planning and Management (EPM) that prescribes certain logical steps in a participatory way intended to involve all stakeholders of concerns. SCP is a participatory tool for achieving environmental sustainable growth and development where UN – HABITAT and UNEP support local authorities to implement Community Infrastructure Upgrading Initiatives (CIUI) and environmental management strategies, including meaningful public participation in developing decision making and planning (UN – Habitat, 2006).

According to Broce *et al*, (2000), researchers and policy makers are linking informal settlements and socioeconomic development as the parameters that affect environmental quality in developing countries. The health situation in the low

income areas is closely related to the availability and quality of environmental service provision. In addition, World Health Organization (WHO) and UN Habitat (2006) observes that environmental management in informal settlements should be provided with basic environmental services such as water, sanitation, waste management, energy and infrastructure.

2.3.3 Environmental Management and Socioeconomic Linkage

According to United Nations–HABITAT and United Nations Environment Programme report (2008), the international recognition of the fact that environmental protection and resource management must be integrated with socioeconomic issues culminated in 1992, Rio Earth Summit. The idea was captured in the definition of Sustainable Development as defined by the World Commission for Sustainable Development, also known as Brundtland Commission in 1987 as;

“Development that meets the needs of the present generation without compromising the ability of future generation to meet their own needs”

The above concept was designed to meet the requirement of both supporters of economic development as well as those concerned primarily with environmental conservation and management at large. Today, it is recognized that social, economic and environment is completely interconnected, environment management in informal settlements and socioeconomic development are dependence variables. Therefore, sustainable human settlements and environmental management are not a choice but a necessity. Life in urban areas including informal settlements must be socially equitable, economically viable and environmentally sustainable.

In September, 2000 at the United Nations Millennium Summit, government leaders agreed on to set time bound measure goals, and one among them is to improve environmental sustainability where effective achievements of it will depend heavily on cities and urban communities. Environmental management in informal settlements is affected by allocation and performance of various socioeconomic developments. They targeted to emphasize the interdependence between the environment, social and economic. It is observed that both do not operate in isolation, thus, should be addressed in an integrated manner at the local and national

structure subjected to central government, strengthened by regional and national infrastructure, budgetary policies, development priorities and decentralization policies (UN – HABITAT, 2006; WHO, 2007).

A report by the Canadian International Development Agency (2008) has shown that environmental management in informal settlements should be addressed through the balancing of social and economic needs. The focus must respond pressure from all sides by successfully investing in infrastructure such as roads, pathways, and sewage system as well as encouraging re-settlements. Government should put the needs of its citizen at the forefront in its planning activities by recognizing the natural assets, its citizens and environment to ensure the best possible returns. In addition, local government has numerous efforts on how informal settlements improve environmental management through the encouragement of maximization of positive socioeconomic activities from house, streets, ward and municipality level. It should encourage citizen and local organization participation to strengthen their role in the implementation of Agenda 21¹ at the local level (UN – HABITAT 2006; WHO, 2007).

Informal settlements are an integral part of urban environment where people are at a close interface with the environment; constantly have to adjust to environmental changes. Urban managers and planners need to find ways of developing informal settlements that enhance resident's quality while reducing the settlements impact on the environment. Central to addressing issues is the adaptation of the participatory planning approach, which recognizes and acts upon knowledge of community values and perceptions of environmental quality (Ballanty & Oalafse, 2009).

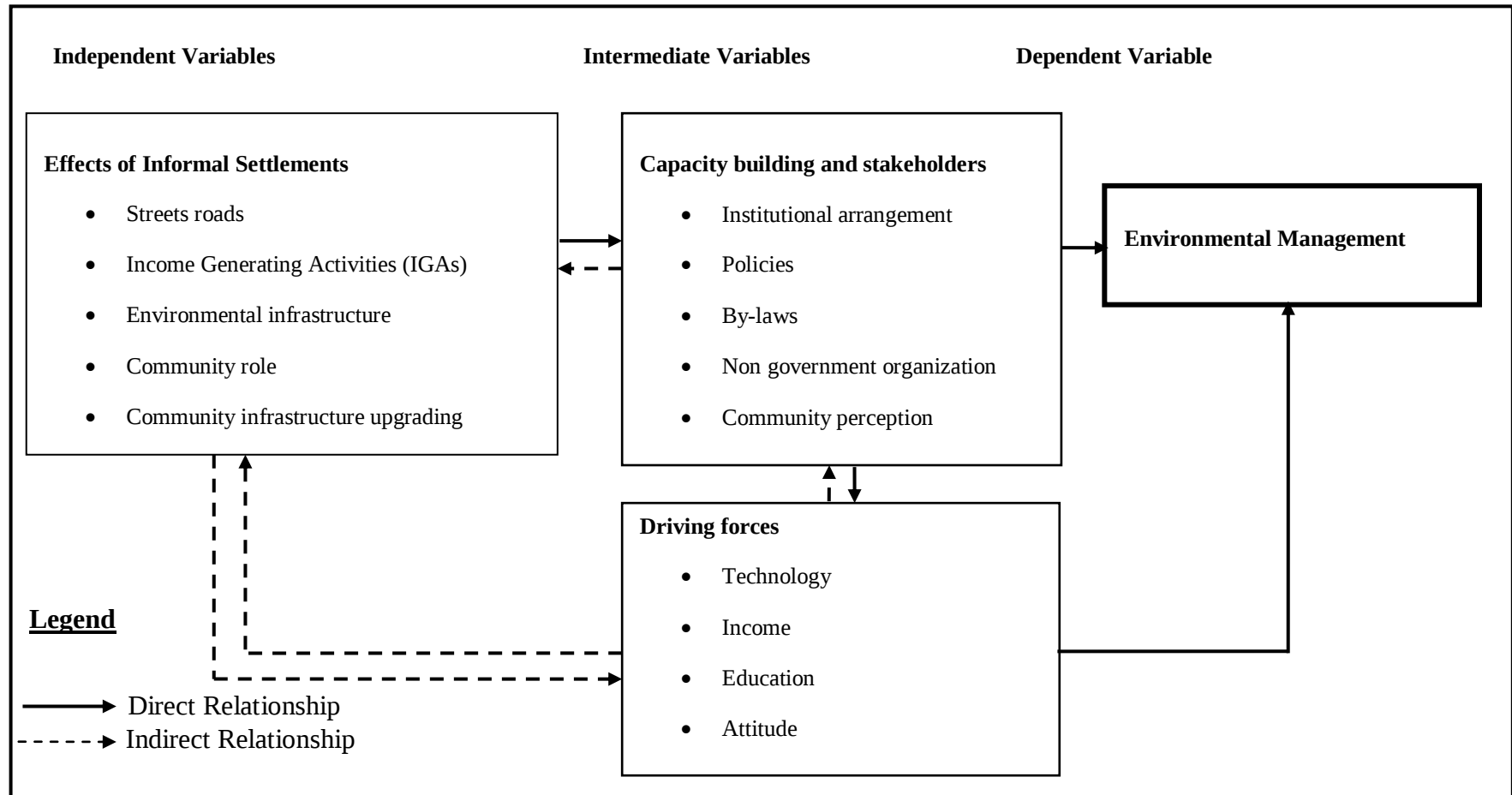
2.4 Conceptual Framework

Figure 2.1 simplifies the systematic structure of interrelated elements in some schematic form which describes the relationship between and among concepts and variables, includes independent, intermediate and dependent variables.

¹ Agenda 21 refers to international action plan to sustainable development that make a balance between production, consumption, population, development and earth's life support capacity

Environmental management is a dependent variable which changes depending on informal settlements by including a number of variations, streets roads, income generating activities, infrastructure for environmental management, community role and community infrastructure upgrading. Moreover, there are intermediate variables which influence directly or indirectly the environmental management in informal settlements, these includes institutional arrangement, policies, bylaws, non-governmental organizations and community perception. The relationship between independence, intermediate and dependent variables are integrated by various driving forces, including technology, income, population, attitude and educations as it is demonstrated.

Figure 2.1 Conceptual Framework



Source: Adapted from Barton and Tsourou (2000)

From the figure above, informal settlements influence changes in environmental management, either positive or negative. Parameters which are associated with these changes are streets roads, income generating activities, infrastructure for environmental management, community role and community infrastructure upgrading. These elements are at the central of change in environmental management in which positive performance of those variables influencing environmental management, thus, reducing the magnitude of trans-boundary movement of waste, environmental degradation and pollution of water air and land.

The negative performance of these variables has limited environmental management which increased the magnitude of waste, environmental degradation and pollution of water, air and land. In addition, these changes are in relationship with intermediate variables which directly or indirectly or supplement changes in environmental quality. These parameters include institutional arrangement, policies, bylaws on environmental management and human settlements development, the perception of community and non-governmental organizations as well as technology, income, education and attitude.

2.5 Research Gap

From the reviewed literature, it was found that there is more concern of informal settlements and services provisioned by many researchers in urban areas of developing countries by focusing much on the provision of public infrastructure such as roads and water supply. There were limited studies in the field of environmental management in the informal settlement as more researchers are concentrating in settlements upgrading, especially in issues of infrastructure. More research is required to focus on environmental management at household level as an integral part of the settlements.

CHAPTER THREE

RESEARCH METHODOLOGY

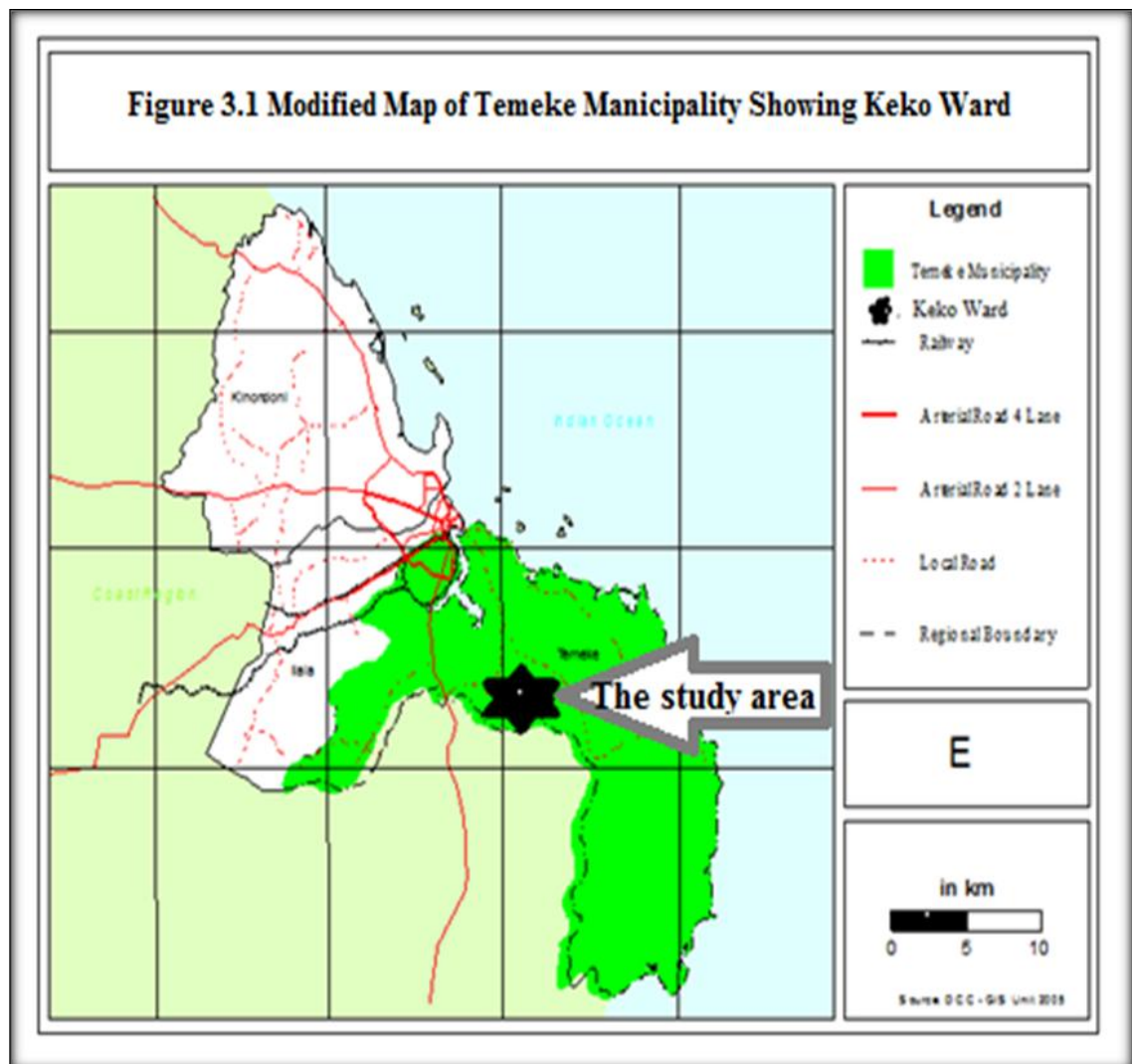
3.1 Research Design

Cross-sectional design was employed in this study. The reason for selecting this type of design was due to the fact that it allows studying different groups of respondents at one point of time. It also provided a suitable room for gathering the required data from different groups such as household members as well as governmental and non-governmental officials at one point in time through the use of questionnaires, interview and observation methods of data collection.

3.2 Study Area

The study was conducted at Keko ward, Temeke Municipality in Dar es Salaam region as figure 3.1 below illustrates the study area. The reason for selecting the proposed study area was due to the fact that Keko Ward is information rich based on observations by the researcher and supported by Ndezi (2011), who suggested areas for further study on Community Initiatives in Addressing Resettlements and environmental quality in Keko Ward. He added that, the magnitude of environmental quality was highly deteriorated to the extent that no one knows the environment quality could be in the future due to rapid expansion of informal settlements in the study area and Temeke Municipality at all.

Figure 3.1 Map of Temeke Manicpality Showing Keko Ward



Source: Adopted from Temeke Municipal Council (TMC), 2010

3.3 Study Population

The study involved the population of 2,610 households from which individuals of 18 years old and above, both sex male and female were systematically being selected. In addition, the study consulted governmental and officials such as streets leaders as well as a ward executive officer, and ward health and environment committee as key informants.

3.4 Units of Analysis

In this study, the unit of analysis was a household within the study area regardless of whether the unit is owner occupied or tenant occupied with coexistence of information related to informal settlements and environmental management. It is from this individual unit, it was possible to get and analyse information on informal settlement and environmental management.

3.5 Sample Size

The sample size was drawn from 2,610 household populations so as to get a manageable representation in relation to time, fund and nature of the data required for carrying out the study.

To minimize errors, Nassiuma (2000) standard formula was used to select the required sample size to represent the respondent population.

$$n = \frac{NC^2}{C^2 + (N-1)e^2}$$

Where:

n = Sample Size

N= Household Population (2,610)

C= Coefficient of variation (10 %)

e = Sampling Error 1 %

Hence

$$n = \frac{(2,610)(10\%)^2}{(10\%)^2 + (2,610-1)1\%^2}$$
$$n = 95.346$$

Therefore, the study included 95 household respondents and 7 key informants from streets leaders ward health and environment committee as well as a ward executive officer, thus, made a total of 102 respondents.

3.6 Sampling Techniques

Both probability and non-probability sampling techniques were deployed to select appropriate respondents. With probability sampling, simple random sampling was used to pick the respondents from households, while with non-probability sampling; purposive sampling was used to select respondents from key informants such as streets leaders, Ward Executive Officer and Keko Ward Health and Environmental Committee.

3.7 Types and Sources of Data

The study used primary and secondary data. Primary data were obtained from the field through questionnaires and observation with respondents, mainly from households. Secondary data were obtained from journals, book reports, official records and newspapers and on the internet as well as other secondary sources that were available and accessible.

3.8 Data Collection Methods

This part covered diverse data collection methods used in this study to collect primary and secondary data, these methods were interviewed, observations and questionnaires.

3.8.1 Interview

Structured interview was employed in gathering information from key informants such as Streets Executive Officers, Ward Health and Environmental Committee and Ward Executive Officer. This method involved obtaining information through face to face conversation between researchers and the above mentioned respondents.

3.8.2 Observation

Non participant type of observation was used throughout the field, hand in hand with taking photographs through the use of the camera. The method facilitated the availability of information which was not provided by other data collection methods or to validate the information gathered by other data collection methods employed in the field.

3.8.3 Questionnaires

Closed questionnaires were prepared in *Swahili* and English languages to gather information from household respondents without any language barrier. This was applied as it allows the collection of a lot of information from 95 respondents in a short period of time, and to be in line with the time required by a researcher to accomplish the data collection process.

3.9 Data Analysis

Data from household respondents were coded, tabulated and analysed through multiple response in which frequencies and cross tabulation analysis were used and findings were presented by frequencies and percentages in tables and figures. On the other hand, Chi-square analysis was used to test the significance of various variables. Information from key informants such as Street Leaders, Ward Health and Environmental Committee as well as Ward Executive Officer was used to complement data from household respondents.

3.9.1 Multiple Response Analysis

Multiple response analysis in this paper is conceptualized as a degree of open-ended in which multiple varieties of questions were several answered to capture the stated objectives of the study. The collected multiple answers were coded in a series of variables because it constituted the combined statistical distribution of more than one variable of interest than separate distribution of single variables. Multiple analyses in the current study, was used to analyse questions with multiple answers which allowed the respondents to select more than one answer, mainly the questions intended to respond the objective one and three of the study. Furthermore, the researcher defined a set of responses in code sheet and analysed it through multiple frequencies and cross tabulation where specific answers were obtained in respect to the number of responses selected by the respondents.

3.9.2 Chi-square Analysis

A Chi-square analysis in this study is referred to as a statistical test which was used to test the significance of variable. It was used to test objective two of this study which intended to examine the significance of community role in managing environmental resources in respect to respondent characteristics in terms of their street, age, sex, education level and occupation in the study area. Moreover, Chi-square analysis in this research was used to evaluate differences between observed and expected data in which the established acceptable p-value for significance was less than or equal to 5% ($P \leq 0.05$).

CHAPER FOUR

PRESENTATION OF FINDINGS

4.0 Introduction

This chapter presents the findings on the basis of the established study objectives, namely (1) to identify the socioeconomic effects of informal settlements in environmental management (2) to examine the community roles in environmental management and (3) to determine the strategies that should be taken to improve environmental management in the informal settlements.

4.1 Characteristics of the Respondents

This part presents the characteristics of 95 respondents who were focused on the study in terms of sex, age, education level and occupation.

4.1.1 Sex of the Respondents

The respondents from this study were both male and female at the table 4.1 indicates.

Table 4.1 Sex of the Respondents

Variable	Number of Response	Percent (%)
Male	35	36.8
Female	60	63.2
Total	95	100.0

Source: Research Findings, 2013

The findings in table 4.1 showed that female is a dominant sex in this study since they formed 63.2% of the total respondents compared to male who formed 36.8%. Therefore, the presented data presents the reality of informal settlements in which women are dominant sex who are traditionally believed to be self employed in informal sectors which are dominant in informal settlements. According to Kiyangi (1994), sex refers to not only women and men but also to socially defined roles of

each sex and their relationships. Gender issues, therefore, as a part of development approach puts people at the centre and ensures their participation in their entire development process including settlements and environmental management.

4.1.2 Age of the Respondents

In terms of the age, respondents of this study were classified in ages of 18 years old, 18-30, 31-43 as well as 44 years old and above as table 4.2 indicates

Table 4.2 Ages of the Respondents

Variable	Number of Response	Percent (%)
Below 18	8	8.4
18-30	62	65.3
31-43	19	20.0
44 and above	6	6.3
Total	95	100.0

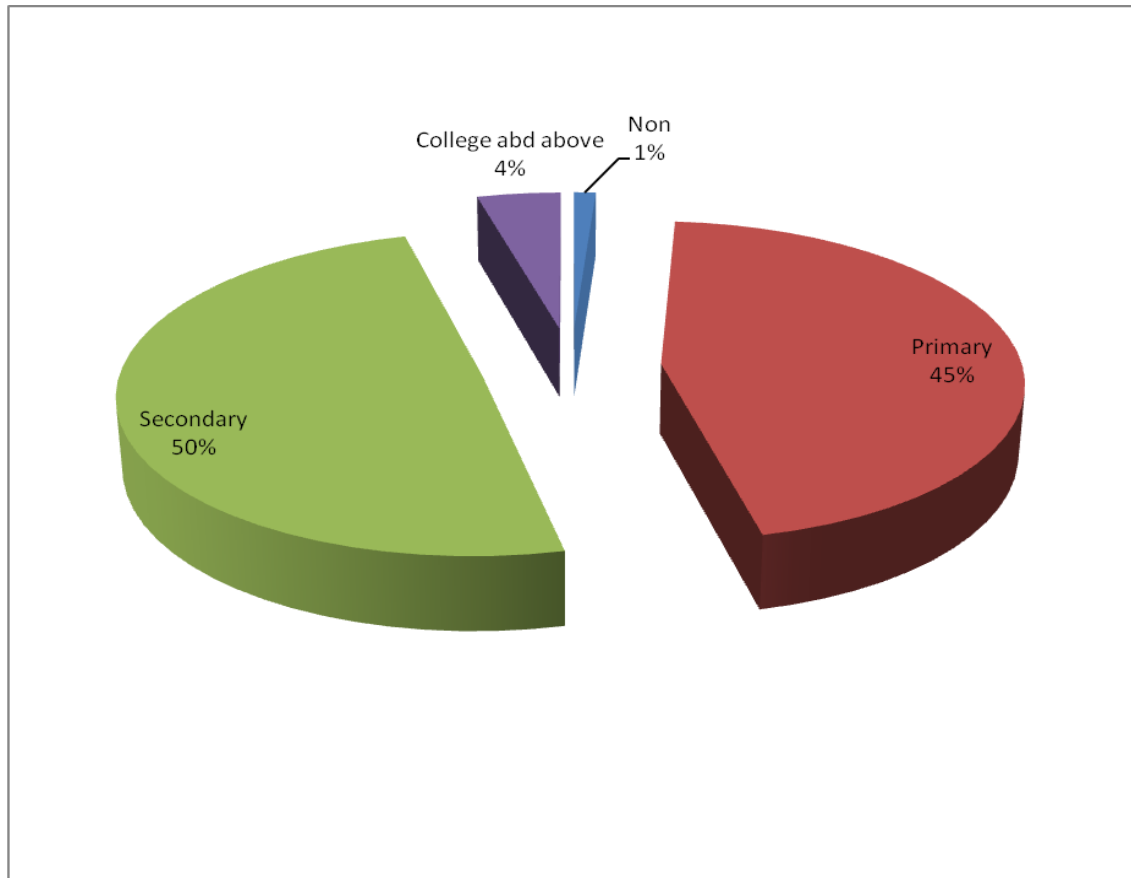
Source: Research Findings, 2013

Results on age of respondents showed that relatively proportional 65.3% of age group fell between 18 to 30 years old, followed by an age group range between 32 to 43 years as indicated in table 4.2. This presents the fact that data were extracted from household members who had a long life experience who were the key players on various issues related to informal settlements and environmental management.

4.1.3 Education Level of the Respondents

Figure 4.1 shows the respondents' levels of education which include non educated respondents and who reached primary, secondary as well as college and above levels.

Figure 4.1 Education Levels of the Respondents



Source: Research Findings, 2013

From the above figure 4.1, it is clear that the majority of respondents (50%) had reached secondary level and 45% of them had a primary level of education. However, 4.2% had reached a college level and above as well as 1.1% did not reach any of the above education levels. Therefore, a great percent of the presented data were gathered from the respondents who had basic education level (primary and secondary) who traditionally believed to have low and medium economic status which forced them to live in informal settlements. Additionally, Mwandosya and

Meena (2005) pinpointed that most of the household members in informal settlements had low education levels, low income groups and poor sanitation.

4.1.4 Occupation of the Respondents

The findings showed that respondents were occupied in different levels of activities such as students, employed and self-employed as table 4.3 shows.

Table 4.3 Occupation of the Respondents

Variable	Number of Response	Percent (%)
Non	7	7.4
Employed	13	13.7
Self employed	59	62.1
Unemployed	16	16.8
Total	95	100.0

Source: Research Findings, 2013

The findings from the table above showed that the majority of respondents (62.1%) were self-employed, 16.8% were unemployed and only 7.4% were students. The dominance of self-employed entails that majority of respondents were involved in socioeconomic activities which are operating in informal settlements as a means of their survival which in turn community were agent and victims of environmental problems.

4.2 Socioeconomic Effects of Informal Settlements in Environmental Management

In this study, the researcher sought to identify the effects of informal settlements in environmental management. The findings revealed that, socioeconomic effects of informal settlements have contributed negatively to environmental management.

Through multiple response analysis, the outputs of the socioeconomic effects of informal settlements on environmental management are shown in table 4.4.

Table 4.4 Socioeconomic Effects of Informal Settlements

Variable	Number of Response	Percent (%)	Rank
Street roads inaccessibility	68	13.2	4
Rapid increase of income generating activities	32	6.2	7
Rapid generation of domestic waste	59	11.4	6
Poor waste disposal	82	15.9	2
Low income earnings	43	8.3	6
Inadequate open space for waste disposal	81	15.7	3
Inappropriate infrastructure for environmental management	85	16.4	1
Negative perception of community on environmental management	67	13.0	5
Total	517	100.0	

Source: Research Findings, 2013

From the findings of the study, the majority of respondents (16.4%) agreed on inappropriate infrastructure for environmental management as a main socioeconomic effect that affects environmental management, 15.9% of the respondent concurred with poor waste disposal and 15.7% of the respondents said that inadequate open space for waste disposal affected environmental management. Moreover, through researcher's observation made during data collection, its observed and validated in

figure 4.2 shows poor environmental infrastructure to be evidence for unsuitable infrastructure for sewage collection from Keko Prison and household located nearby the prison while figure 4.3 and 4.4 shows poor waste disposal and deprived trailer of a tractor used for waste collection lorry which failed to carry waste from its collection point to dumping sites.

Figure 4. 2 Inappropriate Environmental Infrastructure



Source: Research Findings, 2013

Figure 4.3 Poor Waste Disposal



Source: Researchers Findings, 2013

Figure 4.4 Deprived West Transporting Truck



Source: Research Findings, 2013

Furthermore, 13.2% agreed on Street roads inaccessibility, 13% of the respondents said that, negative perception of community on environmental management while 8.3% agreed on low income earning and 6.3% of the respondents concurred with rapid increase of income generating activities. Figure 4.5 and figure 4.6 validate the existed street roads inaccessibility and negative consequence effects of income generating activities on environmental management in the study area.

Figure 4.5 Street Roads Inaccessibility



Source: Research Findings, 2012

Figure 4.6 Furniture Manufacturing



Source: Research Findings, 2013

Additionally, the collected data through interviews from street executive officers supplemented the data collected by questionnaires from household respondents in which 4 street leaders out of 5 who form 90% agreed on that inappropriate infrastructure for environmental management contributed to mismanagement of the environment in their streets. Only 1 street leader agreed with the increase of income generating activities in Keko Magurumbasi A Street contributed negatively on environmental management.

Table 4.5 Socioeconomic Effects of Informal Settlements Growth

Street	SRI	RIIGAs	RGDW	PWD	LIE	IAIWD	IEMTG	NTG	Total	Rank
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	
Keko	13.7	8.4	10.5	17.9	9.5	18.9	17.9	13.7	22.1	2
Keko Mwanga A	17.9	4.2	21.1	25.3	9.5	24.2	26.3	24.2	30.5	1
Keko Mwanga B	10.5	4.2	6.3	10.5	5.3	11.6	12.6	6.3	12.6	5
Keko Magulumbasi A	11.6	6.3	9.5	12.6	8.4	11.6	12.6	11.6	13.7	4
Keko Magulumbasi B	17.9	10.5	14.7	20.0	12.6	18.9	20.0	14.7	21.1	3
Total	71.6	33.7	62.1	86.3	45.3	85.3	89	70.5	100.0	
Rank	3	7	5	2	6	3	1	4		

Source: Research Findings, 2013

Key

SRI	Street Roads Inaccessibility
RIIGAs	Rapid Increase of Income Generating Activities
RGDW	Rapid Generation of Domestic Waste
PWD	Poor Waste Disposal
LIE	Low Income Earning of the Community
IAIWD	Inadequate Open Space for Waste Disposal
IEMTG	Inappropriate Infrastructure for Environmental Management
NTG	Negative Perception of Community on environmental management

Table 4.5 Shows the data analysed through cross tabulation which identified the magnitude of the socioeconomic effects of informal settlements on environmental management in each street of the respondents. The findings showed that inappropriate infrastructure for environmental management was the main effect of informal settlement growth on environmental management in all streets. It was observed that Keko Magulumbasi A was a street that was highly affected by socioeconomic effects of informal settlements on environmental management compared to other streets. Therefore, inappropriate infrastructure for environmental management contributed negatively to the environmental management in the study area.

4.3 Community Role in Managing the Environment in Informal Settlements

In this aspect, it was the interest of the researcher to know the roles played by Community in managing the environment in informal settlements. In this study, different roles were observed as it is shown in statistical table 4.6.

Table 4.6 The Community Roles

Magnitude	Number of Response	Percent (%)	Rank
Very high	14	14.7	3
High	17	17.9	2
Low	50	52.6	1
Non	14	14.7	3
Total	95	100.0	

Source: Research Findings, 2013

The findings revealed that there were minimal community roles to manage the environment in which 52% of the total respondents agreed on it, 17.9 % of the respondents concurred with higher community role while 14.7% agreed on higher community roles and the remaining respondents (14.7%) did not know about the role of the community to manage the environment. Based on the street, sex, education level and occupation of the respondents, the study analysed community roles using Chi-square test which revealed the following findings.

4.3.1 Community Environmental Management Role in Streets of the Respondents

From the Chi-square analysis, it was revealed that there were no significant community roles in managing the environment in their streets. This was due to the fact that the obtained Chi-square value was 0.903 which was greater than the expected value or established value of 0.05 as it is indicated in table 4.7.

Table 4.7 Community Role by Streets of Respondents

	Value	df	Symp.Sig 2-sided
Pearson Chi-square	4.124	12	.903
Likelihood Ratio	6.273	12	.712
Linear by linear association	.007	1	.935
Number of cases	95		

Source: Research Findings, 2013

4.3.2 Community Role in Respect to Sex of Respondents

From the findings it is observed that there were insignificant roles played by males and females on environmental management as the obtained Chi-square value is 0.294 which is above the required value (0.05) as it is shown in the table 4.8.

Table 4.8 Community Role Regarding to Sex of the Respondents

	Value	df	Symp.Sig 2-sided
Pearson Chi-square	3.714	3	.294
Likelihood Ratio	3.760	3	.289
Linear by linear association	2.394	1	.122
Number of cases	95		

Source: Research Findings, 2013

4.3.3 Community Role with Regards to Education Level of the Respondents

The findings in table 4.9 revealed that there were insignificant community role to manage environment regarding to education level attained by the community. This is due to the fact that the Chi-square value was 0.881 which was above 0.05 the required standard values for significance.

Table 4.9 Community Role with Regard to Education Level of the Respondents

	Value	df	Symp.Sig 2-sided
Pearson Chi-square	4.431	9	.881
Likelihood Ratio	6.027	9	.737
Linear by linear association	.022	1	.883
Number of cases	95		

Source: Research Findings, 2013

4.3.4 Community Role with Regard to Occupations of the Respondents

Data analysis revealed that there were insignificant role played by community regarding their occupations to manage the environment. This was due to the fact that the obtained Chi-square value (0.181) was greater than the required the required significance value (0.05) as it is shown in table 4.10

Table 4.10 Community Roles with Regard to Occupations of the Respondents

	Value	df	Symp.Sig 2-sided
Pearson Chi-square	12.619	9	.181
Likelihood Ratio	12.685	9	.177
Linear by linear association	1.205	1	.272
Number of cases	95		

Source: Research Findings, 2013

4.3.5 Specific Community Role for Managing Environmental Resources

Through multiple response analysis it was revealed that 39% of the respondents were involved in the direct waste collection and 38.5% of the respondents contributed cash as a fee for environmental management. Furthermore, 10.7% of the respondents showed that they played a role by reducing the domestic waste while 7.8% and 0.5% of the remained respondents contributed through implementation of community infrastructure upgrading programme and material contribution respectively. The table 4.11 summarizes specific community role in managing the environment.

Table 4.11 Specific Community Role in Managing the Environment

Community Role	Number of Response	Percent (%)
Financial contribution	79	38.5
Material contribution	1	0.5
Direct involvement in waste collection	80	39
Implementation of bylaws on environmental management	7	3.4
Reduces the production of domestic waste	22	10.7
Implementation of community infrastructure upgrading programme	16	7.8
Total	205	100.0

Source: Research Findings, 2013

4.4 Strategies to Improve Environmental Management

In this objective, the researcher sought to know the strategies that were used to improve the environmental management. Respondents were asked to scale the strategies that improved environment management at their streets. It is shown from table 4.12 that 12.8% of the total respondents agreed to the provision of environmental education, 11.6% of the respondents concurred with planning and creating specific dumping sites and 11.5% of the respondents agreed on adequate availability of dustbins at household level, implementation of bylaws and the creation of waste collection points. Furthermore, 10.9% of the respondents agreed on

the involvement of private sectors in environmental management, 10.2% of the respondents supported on strengthening of community infrastructure upgrading programme and formulation of various awards for environmental management and 9.8% of the remaining respondents agreed on community participation in environmental management.

Table 4.12 Strategies that Improve Environmental Management

Strategy	Number of Response	Percent (%)
Strengthening of the community infrastructure upgrading programme	71	10.2
Provision of environmental education	89	12.8
Involvement of private sector on environmental management	76	10.9
Community participation in environmental management	68	9.8
Formulation and implementation of bylaws on environmental management	80	11.5
Formulation of various awards for environmental management	71	10.2
Adequate availability of dustbins at household level	80	11.5
Planning and creating specific dumping sites	81	11.6
Creation of waste collection points	80	11.5
Total	696	100.0

Source: Research Findings, 2013

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.0 Introduction

This chapter covered the discussions of the findings in respect to objectives of the study.

5.1 Socioeconomic Effects of Informal Settlements in Environmental Management

Whether the socioeconomic effects affected positively or negatively the environmental management was the interest of the researcher. The study findings revealed that there were negative socioeconomic effects of informal settlements on environmental management as in this chapter.

5.1.1 Inappropriate Infrastructures for Environmental Management

Environmental Infrastructure (EI) refers to the basic structure which provides environmental services such as water supply and pollution control in human settlements. EI includes an extensive network of water distribution pipes, sewage pipes and septic tanks. The findings revealed that environmental infrastructure was the major environmental management problem in the study area whereby the majority of the respondents (16.4%) who responded through multiple response analysis concurred with it as it was presented in table 4.4. On one hand, environmental infrastructure existed but it depleted and out-dated to cope with the required demands due to the rapid growth of human settlements regardless the land carrying capacity and physical plans which emphasizes the development of necessary infrastructure for environmental management. Moreover, environmental infrastructure in some areas did not exist due to the tendency of people who ignored town planning and zoning by deciding to develop their settlements without taking into consideration the needs of settlement infrastructures necessary for environmental management in the ward.

From the above clarification, it is clear that environmental management was highly affected by inappropriate environmental infrastructure. This was influenced much by unsustainable patterns of human settlements which ignored town planning and techniques which emphasized the human settlements development with regards to necessary infrastructures such as water pipes, sewage pipes and septic tanks for managing sewage from households to disposing points.

In addition, the interview findings elicited from Ward Health and Environmental Committee added that the failure of town planners to address the provision of EI or upgrading of EI was due to unsustainable development of human settlements which was influenced by population growth which created a common business of rental houses which influenced the spatial growth of informal settlement regardless the necessity of environmental infrastructure. This situation posed great challenges to the committee in fulfilling their role to improve environmental management as figure 4.5 shows inappropriate environmental infrastructure for sewage collection from Keko Prison and household located nearby the prison.

Furthermore, His Excellency, the President of the United of the United Republic of Tanzania, Jakaya Mrisho Kikwete (2005) pinpointed that;

“We are witnesses to some of our people in the cities, municipalities and town authorities ignoring town planning and urban zoning regulations, if we do not contain this trend in our urban areas will become jungles of unplanned settlements, unregulated and poorly services delivery. Therefore, the fourth phase government will demand local authorities to address this matter as soon as possible”.

On one hand, the findings are in line with Kombe, (2005), World Bank, (2002b) and Human Habitant report (2008), both supported that rapid, uncontrolled urbanization poses a problem to city government as their capacity to keep pace in providing infrastructure for public services to residential areas in severely strained. Furthermore, informal settlement is characterized by the problems of transportation, lack of usable open spaces, inadequate drainage and sewage system, limited ability to provide roads, pathways leading to poor environmental quality. On the other hand, Wyatt (2009) reported that inefficient, planning and upgrading of environmental

infrastructure in unplanned settlements were caused by scarce financial resources and rapid growth of informality and it results into in costly premature and even complete loss of infrastructure which increases the negative effects in managing the environmental resources.

5.1.2 Poor Waste Disposal

The findings revealed that poor waste disposal were other effects of informal settlements on environmental management apart from inappropriate infrastructure for environmental management in which 15.9% of the total respondents concurred with it as it shown in table 4.4. This entails that waste disposal generated from household and different income generating activities such as garages, shops, food vendors and furniture manufactures were disposed in unsustainable ways which affected many efforts to manage the environment. Figure 4.3 and 4.4 in the chapter four indicated poor waste disposal and deprived trailer of a tractor used for waste transportation nearby human settlement.

Moreover, from the findings, there were no strategic plans put in place to manage waste which created a room for community members and other stakeholders to dispose their waste in proper ways. Responses from an interview with Ward Health and Environmental Committee revealed that the household members created the tendency of collecting waste from residential and responding it unofficially into neighbours' houses at the night hours and, thus, creating community conflicts once they reversed the situation and disposing it to other households which in turn the situation has reduced the capacity of the committee and municipality at all to manage the environment.

5.1.3 Inadequate Open Space for Waste Disposal

One area of the interest that the researcher wanted to establish was inadequate open space for waste disposal. On this aspect it is clearly evidenced from the presented findings that 15.7% of the respondents complained it that it contributed negatively to environmental management. This implies that spatial growth of informal settlements which were influenced by population growth which created a highly habitation

demand to cater the rapid population growth and thus settlements were established into open spaces which previously were used for various human activities such as waste dumping and collection points.

The findings are supported by the South African Report on Human Settlement (2006) which state that the more significant question today with regard to housing and human settlement is whether or not development in the field of sustainable human settlement in the course of sustainable development with respect to interlinked pillars of environmental, social and economic sustainability. Poor waste disposal was exacerbated by the lack of basic services in informal settlements. This indicates that South Africa and other nations in Africa do not have a policy to address the needs and priorities of people living in informal settlement which create great challenges for environmental planners and managers.

5.1.4 Street Roads Inaccessibility

The findings of the study showed that street roads inaccessibility also contributed negatively to environmental management. Table 4.4 indicated that 13.2% of the total respondents agreed on it. This implies that clear socioeconomic variables that are operating in informal settlements influenced population growth which created a common business of rental houses and, thus, increased the level of informality in the ward which hindered street road accessibility. The above situation made people to incur higher costs or additional cost of transporting wastes physically from households in areas which are accessible by different means of transportation. The additional cost created a room for the majority of people who tend to avoid it and decided to manage their environment and waste in, particular, improperly regardless the negative effect they caused on environmental management as figure 4.5 demonstrated.

According to Ali and Suleiman (2009), lack of road access is one of the most common problems caused by residents in informal settlements because there is neither the layout plans nor the regulatory machinery, Residents tends to build to almost 100 percent of their plot size. It has become impossible to provide access

roads to these areas as there is no space for this. Likewise, no area is left open for social services like schools, hospitals, and children's playground which is contrary to the objective of sustainable development which pinpointed in the Agenda 21 chapter 7 of United Nations Centre for Environment and Development which stated that the overall objective of sustainable human settlements is to improve social, economic and environmental quality of human settlements, living and working environment of all people and urban areas in particular (UNCED, 1992).

5.3.5 Negative Perception of Community in Environmental Management

It was found that 13% of the respondents complained on negative perceptions of the community have contributed to environmental miss management in the study area. This means that community were unfamiliar with environmental management since majority complained that it is the role of the government regardless the environmental problems they cause due to various socioeconomic activities performed by them.

However, the interview with Ward Health and Environmental Committee pinpointed that negative perception of community member of environmental management has increased conflicts to the community due to the tendency of some people who ignored environmental management and opted to dispose waste in their neighbour's environment. In addition, community ignored environmental management campaign organized by this committed to and other stakeholders by replying that it's not their role to manage the environment. Therefore, this has limited the efforts of the government and other stakeholders who show positive interests on environmental management in the ward.

5.1.6 Rapid Generation of Domestic Waste

From the findings it was revealed that 11.4% of the respondents agreed that rapid generation of domestic waste hampered effort to manage the environment since population growth in informal settlement has contributed to the increase of consumption pattern. This situation led to rapid generation of domestic waste during preparation and consumption of various products and food at the household level.

According to researcher's observation, household waste was generated daily to a large extent while the Municipality collection schedule from household to dumping site is only one day per week.

5.1.7 Low Income Earnings

From the findings majority of people had primary education (45%) and secondary education (49%) levels as indicated in figure 4.1. Moreover, the majority of the respondents 62.1% employed themselves in informal sectors while 16.6% were not employed and only 13.7 were employed in the formal sectors as shown in table 4.3. This domination of primary and secondary education levels in the study area indicates that the majority of people in the study area had basic education which enabled majority of them to employ themselves into informal sectors which rewarded them little income earnings. This low income earning made people to have low economic status which forced them to continue living in informal settlements, thus, increases the tendency of informality in the ward and made them to avoid the cost of managing the environment.

5.1.8 Income Generating Activities (IGAs)

From the findings it was evident that IGAs included common business of furniture manufacturing and selling food, vending, agriculture, garage, car wash as well as a kiosk for selling various items in the ward. IGAs in the ward were found to attract many people within and outside of Temeke Municipality who utilized socioeconomic activities as it was responded with 6.2% as shown in table 4.4. This tendency increased a common business of rental housing to meet the settlement needs which in a long run has contributed to significantly spatial growth of informal settlements regardless the environmental quality. In addition, due to rapid increase of IGAs it is difficult to control and manage waste generated by IGAs and, hence, it negatively affected environmental management. Figure 4.6 illustrates furniture manufacturing and waste generated at Keko Magurumbasi A Street.

Moreover, the United Nations-Habitat, (2008), Miltin and Satterthwate, (2004) supported the finding related to the effect of income generating activities in environmental management in informal settlements that socioeconomic activities

performed by people who are existing in informal affected negatively the management of environmental resources. These activities include agriculture, furniture manufacturing, industries, food vending, car wash and garages and trade which are performed by majority of low income earners. The unsustainable development of these activities contributing to deterioration of the quality of water, air and land resources to a great magnitude compared to the actions taken to improve environmental quality in urban communities.

According to Harris (2006), mismanagement of environment in informal settlements is linked to socioeconomic effects of informal settlement growth, whereby people are involved in income generating activities and social stratification through developing a common rental housing business. This situation is increasing in urban areas in most of developing countries where people need to live closer to their working areas, thus, influencing the rapid development of informal settlements regardless its supporting infrastructure for managing environment such as waste collection, treatment and disposal as well as pollution control. Furthermore, a World Health Organization report (2006b), added that environmental problems that occurring in informal settlements are associated with socioeconomic development and unsustainable consumption of resources including water pollution from polluted areas, industry and intensive agriculture, outdoor air pollution, solid and hazardous waste accumulation, land degradation, and trans-boundary pollution (Milton & Satterthwate, 2004).

Generally, the findings revealed that the magnitude of the socioeconomic effects of informal settlements on environmental management differs from one place to another where the presented data in table 4.5 Keko Mwanga A Street was affected much (30.5%) and followed by Keko Street (22.1%) while Keko Magulumbasi A, B and Keko Mwanga A were ranked by 20.1%, 13% and 12.6% respectively. Furthermore, environmental infrastructure contributed negatively on environmental management in which 89% of the respondents agreed with it at all streets. Therefore, according to this research environmental management in the ward suffered a lot of

environmental infrastructure which limit efforts taken by different stakeholders of informal settlements and environmental management in the ward.

5.2 Role of Community in Environmental Management

The findings of the study revealed that the majority of the community plays a minimal role in managing environment. It was apparent that 52.6% of the total respondents in table 4.10 revealed that community role is low. This implies that community did not show much interest on environmental management as their priority regardless the environmental problems caused by their various socioeconomic activities. This situation has affected the environmental management efforts taken by different stakeholders who played crucial environmental management role. It is clearly stated that the community remains the main agent and victim of environmental problems but they play a minimal role to reduce the negative effects and maximize the positive effect on the environment which in turn they contributed to poor environmental management in their surrounding environment.

Through Chi-square analysis, it was revealed that there were insignificant role played by community in terms of their street, age sex, education level and occupation. The data obtained from Chi-square analysis regarding to community role in streets of respondents was 0.903 values while 0.294, 0.881 and 0.181 values were obtained on community role in terms of sex, education level and occupation of the respondents respectively. All of the obtained value shows insignificance community roles since the values were above the significance level of 0.05 values. Therefore, the findings imply that community did not address well their environmental management role but this did not mean that they did nothing, except they tried to manage environmental still their roles were very minimal compared to the environmental problems they caused.

Moreover, the interview with a Ward Executive Officer and Streets Executive Officers confirmed that the role of the community to manage the environment is very minimal. The majority of the community raised the complaints that the government is not serious in addressing environmental problems at household level. It is that

primary function of the community is to supplement the role of the government towards environmental management due to the facts that they pay different tax so the government should ensure effectiveness of service delivery where environmental management is within. This is viewed by this study that there was a negative perception of community role to manage the environment in which majority of them tend to avoid their management role and shifted it to the government as the only responsible stakeholder who supports to improve environmental management.

The findings of the current study are supported by Kombe (2005) that environmental management should address the political relationship between government and all citizens by redefining new effective ways of working with local communities, peoples' organizations, the private sectors and other stakeholders in the underpinning of modern urban municipal governance by communities should strengthen their role because they are main agent and victims of environmental problems. Moreover, Ballanty and Oalafse (2009) supported that central to addressing issues is the adaptation of the participatory planning approach which recognize and acts upon knowledge of community values and perceptions of environmental quality.

5.2.1 The Specific Role of Community in Managing the Environment

In line with minimal role played by community to manage environment, the community played a specific role in day to day, the main role played by community daily as being direct involvement in waste collection in 39% of the total respondents agreed on it, another role is financial contributions which were concurred by 38.9% of the respondents as able 4.11 shows. The situation implies that the majority of the community was directly involved themselves in waste collection since their areas are not accessed due to inappropriate roads infrastructure which limited motorcycles and other tools used by the Temeke Municipal Council as a waste transportation means from households to dumping site. Furthermore, financial contributions were applied as waste collection fee from household to dumping sites in which a household was charged one thousand Tanzanian shillings per week.

It was found that waste were collected every Monday of the week but this benefited much the community who are living nearby Chang'ombe and Mandela roads since

those areas were accessible by road infrastructure. The majority of the community did not benefit from this service due to inappropriate street road infrastructure and, thus, refused to contribute financially and decided to involve themselves into a direct waste collection and dumped it improperly into their neighbour's environment. According to the interview with Ward Health and Environmental Committee pointed that waste were collected only one time every week mainly in every Monday and every household were supposed to pay one thousand Tanzanian Shillings but majority of them refused to pay waste collection fee, this has created conflicts between community and the committee and community themselves regarding to environmental management.

Moreover, reduction of the generation of domestic waste is another community role to manage the environment in which 10.7% of the respondents agreed on it. Under this situation community were encouraged to reduce the amount of waste through the performance of various domestic activities which produced waste. This has been accompanied by household campaigns by Ward Health and Environmental Committee which educated community to reduce the quantities of waste they produces and encouraged them to share dustbins as a means of avoiding unnecessary dumping of plastic bags used by them in different domestic activities performed by them. This role showed some achievements but it need to emphasize wellness through educating the community on how to reduce waste generated from domestic activities so as to maximize positive impacts on the environment and encourage management activities.

The implementation of Community Infrastructure Upgrading Programme (CIUP) in which 7.8% of the respondents agreed on it. CIUP considered community at the centre of concern and their participation is crucial in identification and implementation of the project related to infrastructure upgrading in informal settlements. One Ward Executive Officer observed that the programme was implemented by the Temeke Municipal Council in collaboration with the World Bank. The aim was to improve service delivery in un-serviced areas. Through

squatter upgrading programme schemes, community provided their labour power as a result environmental infrastructures such as drainage systems were improved.

Additionally, the findings revealed that the implementation of bylaws on environmental management was concurred by 3.4% of the remained respondents. The Municipality through Ward Health and Environmental Committee has enforced rules and regulation on environmental management in which people who were not abiding by these rules and regulations were caught for penalties. The report by Ward Health and Environmental Committee showed that 45 people were fined between 2012 and March 2013. This indicates that community role to manage environment will increase if seriously the exercise are being implemented. It was further observed from Ward Health and Environmental Committee that the exercise is hindered by financial resources which made difficulties to monitor daily applicability of rules and regulation on environmental management and, thus, the committee waited information from the community which sometimes were later to be known by them for follow-up.

The discussion is supplemented in line with the United Nations Environmental Programme (2006) report which entails that environmental management in informal settlements can be improved by developing strategic vision through effective participation of local and national stakeholders by identifying priority issues and actions to improve housing conditions and its surrounding environment. The vision should provide a road map for developing the city over the next two decades that enhance urban and land management through training of local authorities and community in environmental management. In addition, (Kombe, 2005) pinpointed that the environmental management should address the political relationship between government and all citizens by redefining new effective ways of working with local communities, people's organizations, the private sectors and other stakeholders in the underpinning of modern urban municipal governance of communities should strengthen their roles because they are main agents and victims of environmental problems.

5.3 Strategies that Improve Environmental Management

In order to improve environmental management in the ward, various strategies should be formulated and implemented by community, municipality and other stakeholders of informal settlements and environmental management accordingly.

5.3.1 Provision of Environmental Education

In the light of the findings it was evident that Environmental Education (EE) was the major strategy. EE was found to improve individuals and the whole society environmental knowledge, develop ethics and become environmentally aware and responsible in identifying, implementing and monitored environment. Recalling back on the role of the community, this research identified and discussed that their roles were very minimal due to the negative attitude of the community on environmental management which was contributed much by the lack of environmental education. The municipality should design a number of techniques that will help the EE reach people within the municipality for better environmental management from the household levels to the national level.

Moreover, the interview with Ward Health and Environmental Committee added that EE should be in a form of formal and informal education to benefit community of different background. Formal EE is a school base education for teachers and students as well as other formal institutions while informal EE should be provided in non-formalized institutions. This could reach people through posters, entertainment and by doing activities with the aim of increasing awareness, participation and commitment to environmental management. The finding of this study is supported by the argument that the government should raise public awareness and understanding of the essential linkages between environment and development to promote individual and community participation in environmental management (URT, 1997).

The United Nations Education and Scientific Organization (2011) supported the findings of this study that Environmental Education (EE) is a powerful tool that should be used toward building a more sustainable society that is better informed, has critical views and has wiser and more responsible people. Better educated people

will not look the problem of the World today, but it will provide will provide the means and the determination to address them for the future generation needs and aspiration. Another consequence of EE of the society is to enable people to get a critical reflection of the World. It is also a means of disseminating knowledge and developing skills for developing skills for stimulating changes in behaviors, values, and lifestyle and promotes public support for the needed changes.

5.3.2 Planning and Creation of Dumping Sites

Dumping sites was the one of the contributors to miss management of environmental resources. The creation of dumping sites aided waste collection and transportation from households to specific area which would improve environmental management and, thus, reduces the tendency of improper dumping of waste particularly to neighbours environmental and reduces community conflicts related to waste collection and management. For better environmental management, at least one dumping site should be located in each street as waste collection point from household to municipality dumping sites.

5.3.3 Formulation and Implementation of Bylaws of Environmental Management

This was another environmental management strategy. From the findings it was apparent that bylaws provided a platform for implementation of various rules and regulations patterning to environmental management, hence, increased commitment to the community in different issues related to environmental management in the ward. The adequate enforcement of bylaws was found to improve environmental management as penalties or fines will be the monitoring tools for those who fail to abide those rules and relegations enacted to secure environment. The bidding documents should be distributed to all streets for effective communication to all people more effectively and educate them before implementation. According to Domingo (2002), financial strategy for managing environment come in many different forms, but generally works by making people face the environmental costs they impose on society. Economically, this strategy includes charges or mental improvements, including subsidies in environmental preconditions, tax and financial

support, it further includes enforcement initiatives such as fines for noncompliance with regulation, legal liability for taxes.

5.3.4 Involvement of Private Sectors in Environmental Management

From the findings, it was apparent that in order to improve environmental management the government should involve the private sector in environmental management. It was observed that only 10.9% of the total respondents agreed with this strategy. This indicated that private sectors were not adequately involved in environmental management regardless the limited capacity of local government to manage the environment. The adequately involvement of private sectors will improve environmental management particularly on waste collection in which planning and implementation of environmental in the ward through effective coordination, collaboration and networking of different environment actors which is critical in environmental management in terms of having specific roles, responsibilities, functions and resources for environmental management. In supporting the research findings, Ballanty and Oalafse (2009) argued that, informal settlements are an integral part of urban environment where people are at a close interface with the environment; constantly have to adjust to environmental changes. Urban managers and planners need to find ways of developing informal settlements that enhance resident's quality while reducing the settlements impact on the environment. Central to addressing issues is the adaptation of the participatory planning approach, which recognizes and acts upon knowledge of community values and perceptions of environmental quality.

5.3.5 Strengthening of Community Infrastructure for Environmental Management

Another strategy to be considered is the strengthening of community infrastructure. It was clearly in line with collected data 10.2% of respondents mentioned community infrastructure as their strategy for environmental management. Community infrastructures in this research include a broad range of services such as roads, water systems, sewage systems and waste collection points. This will facilitate and enhance environmental management in which majority of people will access

environmental infrastructure for managing their environment thus increase their commitment in management activities rather than poorly dumping of waste in neighbours' surroundings during the night hours.

The Canadian International Development Agency (2008) supported the findings of this study that environmental management in informal settlements should be addressed through the balancing of social and economic needs. The focus must respond pressure from all sides by successfully investing in infrastructure such as roads, pathways, and sewage system as well as encouraging re-settlements. Moreover, the government should put the needs of its citizen at the forefront in its planning activities by recognizing the natural assets, its citizens and environment to improve the best possible returns. In addition, local government has numerous efforts on how informal settlements improve environmental management through the encouragement of maximization of positive socioeconomic activities from house, streets, ward and municipality level. It should encourage citizen and local organization participation to strengthen their role in the implementation of community infrastructure upgrading schemes (UN – HABITAT, 2006; WHO, 2007).

Furthermore, the study is in line with the report of UN-Habitat (2006) which said that, United Nations Habitat and United Nations Environment Programme (UNEP) launched the Sustainable Cities Programme (SCP) in 1991. The programme entails environmental care of informal settlements in third World countries. The SCP includes a wide range of cross sectoral interventions, typically, involving in solid waste management, environmental health, water resource management, urban transport and air pollution, as well as activities specifically targeted at benefiting the urban poor.

Central to SCP there is Environmental Planning and Management (EPM) that prescribes certain logical steps in a participatory way intended to involve all stakeholders of concerns. SCP is a participatory tool for achieving environmental sustainable growth and development where UN – HABITAT and UNEP support local authorities to implement Community Infrastructure Upgrading Initiatives

(CIUI) and environmental management strategies, including meaningful public participation in developing decision making and planning (UN – Habitat, 2006).

5.3.6 Provision of Environmental Management Award

Provision of award on environmental management is another strategy agreed with 10.2% of respondents. The implication is that the provision of awards will improve environmental management strategies as it will encourage those who committed to management issues and raise awareness, sense of ownership and ethics for many people to become environmentally aware and responsive community by solving various environmental problems arise in their households and streets at all as indicated in the environmental magazine attached in this study in appendix three (3) which indicates president's environmental management award. This strategy will motivate people to manage their environment through the use of different strategies such as financial and materials including shirts, calendars and education to those who show positive interest in environmental management. Proper implementation of this strategy will reduce the negative attitude of people on management issues and will provide long life management activities on environmental resources in the ward.

CHAPTER SIX

SUMMARY, CONCLUSION AND POLICY IMPLICATION

6.1 Introduction

This chapter presents a summary, conclusion and policy implication of the study basing on the established research objectives in relation to the findings of the study as well as areas needed for further study was addressed in this chapter.

6.2 Summary of the Study

Generally, informal settlements are an integral part of the environment, community living in the study area has contributed negatively on environmental management. In addition, their role to manage environmental resources was very minimal. Therefore, there is the need for solutions to improve irregular building and inappropriate infrastructure for environmental management. Moreover, urban planners, managers and community themselves needs to find ways of developing settlements that enhance resident's quality of life while reducing the negative effects of settlement growth on the environmental resources.

6.2.1 Socioeconomic Effects of Informal Settlements in Environmental Management

In the current study, it was found that environmental management was affected negatively by socioeconomic effects of informal settlements in the Temeke Municipality. This was contributed mainly by inappropriate environmental infrastructure which limited the capacity of municipalities to provide environmental management to larger extend. On the other hand, rapid population growth caused habitation demand which increased a common business of rental houses in the wards and, thus, influenced the spatial growth of informal settlements regardless the available infrastructure. Moreover, it was revealed that community remained the main agent and victims of environmental problems due to the nature of informality they develop as a result of rapid population growth caused by socioeconomic activities operating in the wards. The findings of these were presented in table 4.4.

6.2.2 The Role of Community in Environmental Management

In the study, it was revealed that community is the main actor of environmental management as they play different roles that include financial contributions, material contribution, and implementation of bylaws on environmental management, reduction of generation of domestic waste and direct involvement in the collection of waste. It was learned that the rate at which community plays its roles to manage the environment is low compared to environmental problems it caused, this hindered environmental management efforts taken by different stakeholders.

6.2.3 Strategies that Improve Environmental Management

It was found that proper environmental management could be improved through flexible strategies such as provision of environmental education, involving private sectors in environmental management, creation of dumping or waste collection sites, adequate supply of dustbins at household level, formulation and implementation of bylaws on environmental management and provision of awards for environmental management. The positive performance of these strategies will improve environmental management while inadequate implementation of it will reduce the performance of environmental management. Based on these findings, stakeholders such as government, community and non-government organizations should take collective responsibilities which will improve environmental management in informal settlements.

6.3 Conclusion

This research has exposed that environmental management was negatively affected by the effects of socioeconomic activities that operate in the study area. The study went further and examined the community role to manage environmental resources were very minimal compared to the environmental problems they cause. Therefore, the study suggested that, the provision of environmental education, creation of waste collection points, strengthening the role of community participation, improving of streets roads and environmental infrastructure, involvement of private sectors, creation of environmental management awards, as well as formulation and

implementation of bylaws on environmental management are appropriate strategies for improving environmental management in the study area.

6.3.1 Socioeconomic Effects of Informal Settlements in Environmental Management

In order to improve environmental management in informal settlement infrastructure for environmental management should be addressed positively and there should be adequate creation and utilization of environmental infrastructure. The government through town planners should ensure that population growth reflects the land carrying capacity in which human settlements should be developed with respect to necessary infrastructure for managing the environment. Furthermore, environmental management should be improved due to positive operation of socioeconomic variables which balance the relationship between informal settlement growth and environmental management in which environmental problems should be treated on time and stakeholders including community, municipal and private sectors involved in informal settlements and environmental management will act on it and play their part accordingly.

6.3.2 The Role of Community in Environmental Management

Communities are the centre of concern in environmental management since they are primary agent and victim of environmental problems occurring at their households. Communities of Keko ward have shown less responsibility in playing positive roles of managing the environment. The role of the community should be strengthened to capture environmental damage caused by them and should be provided with environmental education basing on its positive and negative effects. This will community reduce the negative effects and maximize the positive effects of socioeconomic of informal settlements on environmental management.

6.3.3 Strategies that Improve Environmental Management

For better environmental management, appropriate strategies are to be planned, executed, monitored and evaluated at all levels from household, streets, ward and municipality. These strategies should be in line with various policies such as Human

Settlements Development and environmental. Temeke Municipality should prepare a Municipal environmental policy which will improve environmental management by reflecting the environmental problems occurring in their areas of jurisdiction mainly in informal settlements. In this aspect, every stakeholder should dare to implement the planned strategies to improve the sustainability of environmental resources which are available.

6.4 Policy Implications

This section relates the viability of human settlements development, environmental policies and the findings of this study with respect to its stated objectives.

6.4.1 Human Settlement Development

The development of human settlements in the ward has not attained the policy goal of ensuring sustainable settlements which accommodate the provision of infrastructure for better service delivery. This is due to the negative effects of socioeconomic development operating in informal settlements which increased and will continue to increase negative effects on settlement infrastructure. At the same time, the delivery of settlement services is inadequate and lacking infrastructure for environmental management leading to environmental problems caused by unsustainable development of human activities.

6.4.2 Environment Management

The implication of environmental policy in the ward is ineffective and it failed to achieve the stated national environmental policy goal of ensuring the attainment of sustainable development which balances the relationship between social and economic development while ensuring sustainability of environmental resources due to inadequate institutional coordination and rapid growth of population. Other contributed factors include inadequate monitoring and information systems, inadequate capacity to implement environmental programmes, inadequate involvement of major stakeholders such as local community, nongovernmental organizations and the private sectors in addressing environmental management in Keko ward and Temeke Municipality at large.

6.4.3 Areas for Further Study

The researcher is kindly requesting other researchers to continue spend their resource efficient and effective way in searching the knowledge gap on environmental management in informal settlements. More focus should be on environmental education, community participation in environmental management, implementation of environmental policy at household levels, municipal environmental policies and bylaws in managing environmental resources, waste management and the impacts of community infrastructure upgrading schemes.

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APPENDICES

Appendix 1: Questionnaire for Households Respondents

Dear Sir/Madam

You are kindly requested to answer a set of questions by giving relevant information.

The study is purely for academic purpose only. Your contribution towards smooth realization of the indented purpose is highly appreciated.

Instructions

- i. Please, tick in the appropriate box

Section A: Respondents Characteristics

1. Sex:

- | | |
|-----------|--------------------------|
| 1. Male | ☐ |
| 2. Female | ☐ |

2. Age

- | | |
|-----------------|--------------------------|
| 1. Below 18 | ☐ |
| 2. 18 - 30 | ☐ |
| 3. 31 - 43 | ☐ |
| 4. 44 and above | ☐ |

3. Education Level

- | | |
|----------------------|--------------------------|
| 1. Non | ☐ |
| 2. Primary | ☐ |
| 3. Secondary | ☐ |
| 4. Adult | ☐ |
| 5. College and above | ☐ |

4. Occupation(s)

- | | |
|------------------|--------------------------|
| 1. Student | ☐ |
| 2. Employed | ☐ |
| 3. Self Employed | ☐ |
| 4. Non | ☐ |

5. Street

- | | |
|-----------------------|--------------------------|
| 1. Keko | ☐ |
| 2. Keko Mwanga A | ☐ |
| 3. Keko Mwanga B | ☐ |
| 4. Keko Magurumbasi A | ☐ |
| 5. Keko Magurumbasi B | ☐ |

Section B: Socioeconomic effects of the informal settlements in environmental management in the informal settlements

6. What are the socioeconomic effects of the informal settlements in environmental management? Please, ticks if the following variable affects environmental management at your street level

- | | |
|---|--------------------------|
| 1. Street road inaccessibility | ☐ |
| 2. People attitude of environmental management | ☐ |
| 3. Poor waste collection | ☐ |
| 4. Poor waste disposal | ☐ |
| 5. Low income earnings | ☐ |
| 6. Rapid production of waste | ☐ |
| 7. Inadequate open space for dumping sites | ☐ |
| 8. Inadequate Infrastructure for environmental management | ☐ |
| 9. Community conflicts at street level | ☐ |

7. How do you assess environmental management in informal settlements?

Please, select and tick in one of the following boxes provided.

- | | |
|---------------|--------------------------|
| 1. Increasing | ☐ |
| 2. Decreasing | ☐ |
| 3. Balancing | ☐ |
| 4. None | ☐ |
| 5. Don't know | ☐ |

Section C: Community roles in managing the environment in the informal settlements

8. How do you assess the roles of the community in managing environmental resources at your street? Please, choice only one answer and tick in the appropriate box

- | | |
|---------------|--------------------------|
| 1. Increasing | ☐ |
| 2. Decreasing | ☐ |
| 3. None | ☐ |
| 4. Don't know | ☐ |

9. Indicate by putting many tick as many variables as you can if the following roles are being played by the community to manage environmental resources at your street? Please, tick in appropriate box/boxes of your selection

- | | |
|---|--------------------------|
| 1. Financial contribution | ☐ |
| 2. Material contribution | ☐ |
| 3. Formulation of environmental management committee | ☐ |
| 4. Implementation of bylaws in environmental management | ☐ |
| 5. Minimization of domestic waste | ☐ |
| 6. Environmental education | ☐ |
| 7. Community participation in environmental management | ☐ |
| 8. Implementation of Community Infrastructure Upgrading | ☐ |

Section D: Strategies that improve environmental at your street

10. How environmental management will be improved at your street? Please, tick in the space(s) provided if your household apply one or more than one variables mentioned below:-

- | | |
|---|--------------------------|
| 1. Implementation of Community Infrastructure Upgrading Schemes | ☐ |
| 2. Environmental education | ☐ |
| 3. Involving private sectors in environmental management | ☐ |
| 4. Community participation in environmental management | ☐ |
| 5. Bylaws on environmental management | ☐ |
| 6. Economic incentives | ☐ |
| 7. Domestic waste minimization campaign | ☐ |
| 8. Formulation of environmental management committees | ☐ |
| 9. Renovation of environmental management infrastructure | ☐ |
| 10. Creation of dumping sites | ☐ |

Appendix 2: Interview Guide for Key Informants

Section A: Respondents Characteristics

1. Street/Ward.....
2. Occupation.....
3. Education Level
 1. Non ☐
 2. Primary ☐
 3. Secondary ☐
 4. Adult ☐
 5. College and above ☐

Section B: Socioeconomic effects of informal settlements in environmental management

4. What are the influences of the socioeconomic effects of informal settlements in environmental management?

1. Street road inaccessibility_____
2. People attitude of environmental management_____
3. Poor waste collection_____
4. Poor waste disposal_____
5. Low income earnings_____
6. Rapid production of waste_____
7. Inadequate open space for dumping sites_____
8. Inadequate Infrastructure for environmental management_____
9. Community conflicts at street level_____
10. Other(s)_____

5. How do you assess environmental management as a result of rapid growth of informal settlements in this street/ward?

Section C: The roles of community in managing the environment in informal settlements

6. How do you comment on the roles played by community to improve environmental management in informal settlements in general and this street or ward in particular?

Section D: Strategies that will improve environmental management in informal settlements

7. Which strategies will be applied to improving environmental management in informal settlement?

Appendix 3: Environmental Magazine



Source: URT, 2010