EFFECT OF SOLID WASTE MANAGEMENT PROJECTS ON THE WELFARE OF THE LOCAL COMMUNITY; A CASE OF SOLID WASTE MANAGEMENT PROJECTS IN MOMBASA COUNTY, KENYA

BY

KEVIN NGATATAKALAMA

A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF ARTS IN PROJECT PLANNING AND MANAGEMENT OF THE UNIVERSITY OF NAIROBI

2016

DECLARATION

This research project report is my original work and has not been submitted to any other university or institution for examination.

Signature ..... Date .....

KEVIN NGATATA KALAMA

REG NO: L50/70010/2013

This research project report has been submitted for examination with my approval as the University Supervisor.

Signature……. Date ……

PROF. CHARLES RAMBO
ASSOCIATE PROFESSOR, DEPARTMENT OF EXTRA-MURAL STUDIES
UNIVERSITY OF NAIROBI

DEDICATION

This work is dedicated to my lovely family; my loving and caring parents Michael and Elizabeth Kalama, my siblings Humphrey, Bertha, Mildred, and Eli. My supportive friends Patricia, Ndaiga, Ngumbao, Mbeyu, Belina, Lilian, and Wandili. My manager for giving me time to work on this project. Let this be an inspiration to you.

ACKNOWLEDGEMENT

I wish to express my gratitude to the University of Nairobi, more specifically, the Mombasa Campus for giving me the opportunity to undertake this course. To my supervisor, Professor Rambo who has always dedicated his humble time for me to finish this work. To the course lecturers, staff in the department of Extra Mural Studies, your invaluable support enabled me to successfully go through this course. I wish to thank my colleagues who were a source of encouragement thus enabling me to go through this course.

My sincere gratitude goes to my wonderful classmates at University of Nairobi, Project Planning and Management class of 2013 for the invaluable support and assistance that I have always gotten when in need. God bless you abundantly.

Last but not least, I wish to thank God Almighty for his health, provisions and protection throughout the times, seasons and moments of study for this degree.

TABLE OF CONTENTS

DECLARATION ..... **ii**
DEDICATION ..... **iii**
ACKNOWLEDGEMENT ..... **iv**
TABLE OF CONTENTS ..... **v**
LIST OF TABLES ..... **ix**
LIST OF ACRONYMS AND ABBREVIATIONS ..... **x**
ABSTRACT ..... **xi**
CHAPTER ONE **1**
INTRODUCTION **1**

1.1 Background of the Study 1
1.2 Statement of the Problem 7
1.3 Purpose of the Study 9
1.4 Objectives of the Study 9
1.5 Research Questions 9
1.6 Research Hypothesis 9
1.7 Significance of the Study 10
1.8 Limitations of the Study 11
1.9 Delimitation of the Study 11
1.10 Basic Assumptions of the Study 12
1.11 Definitions of Significant Terms 12
1.12 Organization of the Study 13

CHAPTER TWO **14**
LITERATURE REVIEW **14**

2.1 Introduction 14
2.2 The Concept of Solid Waste Management 14
2.3 Employment Opportunities and Welfare of the Local Community 17

2.4 Health Related Issue and Welfare of the Local Community 20
2.5 Environmental Pollution and the Welfare of the Local Community 23
2.6 Conflicts and Welfare of the Local Community 28
2.7 Theoretical Framework 31
2.8 Conceptual Framework 33
2.9 Summary of Literature Review 34
CHAPTER THREE 35
RESEARCH METHODOLOGY 35
3.1 Introduction 35
3.2. Research Design 35
3.3 Target Population 35
3.4 Sample Size and Sampling Procedure 36
3.5 Research Instruments 37
3.6 Data Collection Procedure 39
3.7 Data Analysis Techniques 39
3.8 Ethical Considerations 39
CHAPTER FOUR 41
DATA PRESENTATION AND INTERPRETATION 41
4.1 Introduction 41
4.2 Return Rate of the Questionnaires 41
4.3 General Information 41
4.4 Responses in Relation to Employment Opportunities 43
4.5 Health Issues Associated With Solid Waste Management Projects in Mombasa County 46
4.6 Social Conflicts Associated with Solid Waste Management Projects Implementation ... 49
4.7 Responses on Items on Environmental Pollution 51
CHAPTER FIVE 58
SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS 58

5.1 Introduction 58
5.2 Summary of Findings 58
5.3 Discussion of Findings 60
5.4 Conclusions 63
5.5 Recommendations 64
5.6 Suggestions for Further Research 64
Appendix A: Letter of Introduction 75
Section Two: Employment opportunities 77
Section Three: Health 78
Section Four: Training Practices 79
Section Five: Environmental Pollution 79

LIST OF FIGURES

Figure 1: Conceptual framework……..……..33

LIST OF TABLES

Table 3.1 Target Population ……. 36
Table 3.2 Sample Population ……... 37
Table 3.3 Operationalization Table …….. 40
Table 4.1 Basic Information about Respondents ……. 42
Table 4.2 Response on Employment Opportunities …… 44
Table 4.3 Degree of Rating of Jobs Creation …….. 45
Table 4.4 Mean and Standard Deviation Scores for Job Creation …….. 46
Table4.5 Responses on Health Issues Associated with Solid Waste Movement Projects …….. 47
Table.4.6 Rating of Health Issues on a Scale ……..... 47
Table 4.7 Mean Scores for Issues Associated with SWM Projects…….48
Table 4.8 Responses on the Issues of Social Conflicts…….49
Table 4.9 Social Conflict on a Likert Scale……. ……50
Table 4.10 Mean Scores for Social Conflicts…….……..51
Table 4.11 Responses on Environmental Pollution …… 51
Table 4.12 Rating of the Influence of Technology in WSPs Implementation ……... 52
Table 4.13 Mean Scores on Pollution and SWM Projects ……. 53
Table 4.14 Testing of the First Hypothesis …… 53
Table 4.15 Testing of the Second Hypothesis ……... 54
Table 4.16 Testing of the Third Hypothesis ……... 55
Table 4.17 Testing of the Fourth Hypothesis ……..56

LIST OF ACRONYMS AND ABBREVIATIONS

AEZ-Agro-Ecological Zone

CCM- City Council of Mombasa

CWPs Community Water Projects

EIA – Environmental Impact Assessment

EMCA- Environmental Management and Coordination Act

FAO-Food and Agriculture Organization

GoK-Government of Kenya

ICAD-Institute of Civic Affairs and Development

ICT-Information Communication Technologies

IPO – Independent Private Operator

M&E-Monitoring and Evaluation

MGDs-Millennium Development Goals

MSW- Municipal Solid Waste

NEMA - National Environmental Management Authority

NAWASCO-Nairobi Water and Sewerage Company

NETWAS- Network for Water and Sanitation International

NGOs -Non-Governmental Organizations

SPSS - Statistical Package for Social Sciences

SW – Solid Waste

SWM- Solid Waste Management

UNICEF-United Nations Children's Fund

UNDP- United Nations Development Program

UNEP- United Nations Environmental Programme

WHO-World Health Organization

ABSTRACT

Waste management has been important since time immemorial. With the unprecedented increase in population worldwide, especially in Sub Saharan Africa, waste management has been vital for good health, good environment and aesthetics of its towns and cities. The research intended to study the effect of solid waste management projects on the welfare of the local community; a case of solid waste management projects in Mombasa county, Kenya and it focuses on the following objectives:- to examine how employment opportunities created by waste management projects affects the welfare of the local communities of Mombasa County, to assess how health related problems created by waste management projects affects the welfare of the local communities of Mombasa County, to examine how environmental pollution created by waste management projects affects the welfare of the local communities of Mombasa County, and, to determine how social conflicts created by waste management projects affects the welfare of the local communities of Mombasa County. The research design is a descriptive survey. The target population of this study is 6420 from the said 3 regions. A pilot study was done to check the reliability and validity of the instruments'. Data was collected using a structured questionnaire which were administered personally, via e-mails, enumerators and pick them after they have been filled. The data was then coded and analyzed using the SPSS version 20.0. Chi-square tested the hypothesis. 99 questionnaires were administered to the respondents with a return rate of 91%. The study concludes that the SW projects in Mombasa County just like any other in the rest of the world have led to jobs creation in the area and other surrounding environs. It also concludes that health hazards and issues have been surrounding the implementation of the SW projects in the area just like any SW projects across the world in countries like China, India, Uganda, and many more. Social conflicts, wars, misunderstandings and societal clashes have been linked to SW projects implementation in the Mombasa County. Finally, the study also observes that environmental pollution, soil degradation, ground water contamination among others has been associated to the implementation of waste projects in the Mombasa County. The study recommends that SW projects in the county should be formally organized from the low levels/village levels to the wider county levels since the projects have been proving more than self-employment. The study also recommends that health hazards associated with SW management projects need to be controlled since the waste doesn't only lead to diseases cause but has led to a number of deaths and strained families' health care. It also recommends social conflicts associated with such projects in the county at large must be addressed through various avenues like mutual designed committees, reconciliation bodies and penalties should be attached to those who break the set rules. The study also recommends that bodies like NEMA should be contacted in doing an up to date EIA so as to come up with better strategies of handling and disposing the waste with minimal pollution to the environs if any

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Since the early 1990s, many governments have shown great concern in improving Solid Waste Management especially in the cases of urban Solid Waste Management. in developing countries unlike the well-established developed countries. This is due to rapid economic growth and urbanization and in these countries has led to in large increases in output of refuse causing poor performance of waste disposal systems that are used in these countries and rapid depletion of landfill and (Ziro, 2013). This according to the Government of Kenya (GOK, 2010a) has left over 90% of the developing countries throwing their weights towards Waste management programs or projects. The World Bank (2013) defines Waste management is a process that involves handling, packaging, treatment, recycling, reusing, storage and disposal of waste in a way that is environmentally sound for human health and environmental protection.

However, the World Bank has a contradicting report between the developing countries and the developed ones in relation to addressing the waste management issue. For example, its report of 2010 that says, in the progression of achieving proper Solid Waste Management, a lot of efforts in many developing countries have put in a lot of effort on collection and disposal and ignored recycling of waste which can result in the fall of the waste quantities that will eventually require disposal and even more significantly the impact of this process of Waste Management to the welfare of the people and the general environment (World Bank, 2010; Ziro, 2013).

Elias, Trynos and Tendayi (2013) argue that, in the recent decades amongst the commonest characteristics noticeable in the developing nations has been the disparity between sanitation infrastructure provision and rapid urban population growth. The challenges of poor waste management practices impacting on the deteriorating ecosystems of the rapidly transforming cities in these countries has worsened this disparity. This mismatch, described as ‘urbanization without health’, is uncollected household waste, the absence of water, sanitation and other basic facilities, growth in illegal settlements, and the catalogue of overcrowding which are typical of many urban centres in Africa, Asia and South America. The result is that many millions of the

urban poor live in neighbourhoods that are typically harmful to their everyday health, and general well-being. Tendayi (2014) in his comparative study between solid waste management in developing countries and developed ones, he noticed a great difference in the sense that, in developed countries, solid wastes are recycled for example thus creating new profitable products like fertilizers that is exported besides the jobs created by the recycling industries. This is different from the developing countries where the effects are negatives, starting from health hazards to conflicts.

From the global perspective, countries that have had similar impacts of waste management programmes like Kenya are those in the developing Asia and southern America continent. In India for example, the government report of 2013 shows that Urban Population is has been and is increasing and it induces various environmental issues like Climate Change, environmental pollution due to overexploitation and emissions from manufacturing and more specifically the production of trillion of tons of both solid and non-solid wastes (GoI, 2013). The World Bank (2013) shows that, India has over 1.21 billion people (2011 census), the rural to urban distribution is 68.84% & 31.16% and in 2001 census the level of urbanization increased from 27.81% to 31.16% in 2011 Census. IPCC (2012) as cited in Kim 2014) shows that, due to high numbers of urban populations in India, a number of private and government related firm have for a long time been contracted to help ease the problems associated with the human associated environmental wastes.

According to UNDP (2012) the uncontrolled population growth in India and China has led to development of various projects that are aimed at managing the waste situations in these countries that have had severe impacts to the communities more than expected. For example, in India 115000 MT of solid waste is estimated to be generated daily in the country. 5% is the yearly increase. In cities waste generation per capita varies from 0.2 kg to 0.6 kg per day depending on the population size. About Rs. 500 to Rs.1500 per ton was spent by ULBs on solid waste collection, transportation, treatment, and disposal. This means that there is an extra waste management costs that are passed to the citizens leading to high costs of living. Also, more pollution has been caused by uncontrolled dumping by waste management companies; leading to more exposure to health hazards, issues like displacement of individuals from dumping sites and

many more have also been at bow in this country.

However, the GoI (2013); UN/DESA, GoJ, and UNCRD (2010) have shown that, various waste management projects/initiatives in India have led to a number of positive impacts to the people of the republic of India and this has to be noted. Included positive impacts are; methane recovery in wastewater treatment, renewable electricity generation, air pollution is reduced which is caused by unscientific dumping and burning of Municipal Solid Waste (MSW), Employment generation from the Captive power plant is one of the economical co benefit attached to these projects in India, Reduction in water pollution, Reduction in occurrence of contagious diseases, Waste from the Bio gas production chamber is converted in to organic manure and sold to the farmers in the neighbouring areas etc. The Department of Water Affairs & Forestry (2011) summarizes the benefits of waste management initiates in India in the 21st century to be, ,sewage treatment , biogas based electricity generation that helps in the reduction of CO2, Reduction in Air and water pollution, reduction of contagious diseases, Production of organic manure etc.

As per the African continent, waste management and its impacts have been felt well in Ethiopia than any other developing country (UN-HABITAT, 2011). According to UNEP (2011), the pitiable physical environmental conditions that are presently characterized by poor shelter, overcrowding in squalid housing and neighbourhoods, unsafe drinking water, poor sanitation, water pollution, indoor and air pollution, and poor waste management has imperiled the health of the residents of Addis Ababa. The high incidence of waterborne pathogens in the catchment interface of Addis Ababa that are responsible for the spread of communicable diseases such as cholera, typhoid, and amoebic infections, mainly dysentery has worsened the urban environmental fabric, due to the low priority accorded to sanitation that has been largely blamed for.

UNEP (2014) shows that, amongst the most adverse impacts of poor waste management by various firms, particularly municipal waste, in Ethiopia today is the occurrence and prevalence of diseases such as respiratory problems and malaria, as well as other illnesses through the contamination of ground water. Great danger is posed by biomedical wastes in Ethiopia also as it was estimated in a report that 20% of the biomedical waste is “highly infectious”. It is also hazardous as it is often disposed of into the sewage system or drains. Presence of poor sanitation

poses serious consequences for the residents' health and a report submits that "most of the child mortality could be related with this problem". Regarding to the living standards, solid waste leads to blockage in the drainage system which leads to flooding in the streets. Consequently, mosquitoes and bad odour are among the negative impacts resulted.

However, studies by OECD (2012) have shown that, a number of positive impacts have been associated to various waste management projects that have been initiated in the country for the last 5 years. Included are issues like jobs creation for the people employed to handle waste by the municipals, revenue collection throughout the country, improved production through recycling of waste materials like plastics and reduction of health diseases in areas where disposal have been done correctly.

In Tanzania, waste control has been a problem not only in the urban centres of Dar Es laam, Tanga, Shinyanga, Tharime, Dododma, Kigoma, Mwanza, Arusha, but, it has been a dominant challenge in the rural homes of the Sukumas, Chaggas, Shambaa, Nyamwezi, Nyasa people in Mbeya and many more who still go to the bush instead of latrines, over 57 years after independence (UN-HABITAT 2010). According to Arnold & Lardinois (2010) mismanagement of natural resources such as the mismanagement of natural resources and various types of wastes like industrial waste, sewage waste and many more that cause environmental obstacles have been contributing factors and results of the relatively low economic status of the country. Simon (2011) argues that, the population increase in all zones of Africa has not been supplemented by the necessary expansion in basic services, including those of waste management. As a result, many urban areas lack adequate waste collection and disposal facilities.

Simon (2011) continues to show that the coastal city of Dar es Salaam faces a similar challenge. Opportunity is given to some residents and some solid waste contractors who are without good equipment this leads them to resort to dumping waste in open spaces, in drains, along and across streets, in manholes, and in other similar areas. Further wastes are drained into water bodies or river banks or onto beaches. Causes of solid wastes may include mortality to marine biodiversity, negative aesthetic impacts affecting recreation and tourism, navigation hazards3 etc. Amongst strategies and measures proposed by the government of Tanzania is contracting both the

government and the private agencies to run the waste management projects in the big towns (Okalebo *et al.* 2014).

Tanzanian government has taken some initiatives to control the problem of solid waste, but despite that the problem stays a threat to the marine, coastal environment, and coastal population. Among the threats as a result of this includes, dead of both plants and animals like fish leading to food shortage thus anima-human conflicts, social conflicts like wars between contending street groups in the quest of collecting recyclable materials from the dumping sites, health issues like water borne diseases and many more.

Kenya's waste management projects have existed for over 40 years now starting with strategic programs/initiatives that encouraged both the rural and urban individuals to come up with pit latrines and waste dug pins to control dumping of garbage. Since time immemorial the responsibility of initiating and managing projects that are geared towards collecting and disposing of solid and liquid waste are charged to Kenya local authorities within their area of jurisdiction (GoK, 2012a). Estimates from UNEP and the World Resource Institute (2009) in developing countries numerous local authorities spend 30% budget allocation for waste collection and discarding however they only manage to collect about 50% to 70% municipal solid waste. Another report by the United Nations (2013) shows that, in east Africa, only 30% of the various waste management initiatives have positively benefited the local communities specifically in Rwanda whereas 70% of these projects have left much negative impacts to the communities because they are left in the hands of unqualified contractors or municipal councils that have little expertise/knowledge on how to maintain the required standards for mutual benefits without looking at personal profits.

A research by Nthambi (2013) shows that, a number of projects have been proposed to help ease the adverse effects of wastes in the urban centers (more specifically in the slums) by various bodies including the national govern, county governments, NGOs, CBOs and various firms through PPPs programs but little has been achieved. According to her findings, in an interview that involved 100 respondents, 76% argued that the various waste management projects are just targeted at collecting either solid or liquid wastes in a common point/dumpsite and leave it to

decompose; a factor that has exposed over 72% of the people living adjacent to these dumping sites into the social conflicts, health hazards and many more.

Another study by Wambua (2012) in Nairobi County shows that there are projects that have been initiated by the county and national governments, local communities, NGOs etc. that are aimed at solving the chronicle issues that have surrounded the urban waste in the residential estates and the industrial centers. However, Wambua notes that despite the advances that have been made for a long time in relation to waste management in Kenya, much of its waste management projects have not addressed issues like recycling but have put much emphasis on dumping of both the solid and sewage waste. In the largest industrial town of Thika for example, there exists only one open dump in the town which has resulted in air and water pollution. The dump handles both organic and inorganic waste; inorganic wastes pose a great threat due to the fact that it is non-biodegradable. Pollution has left people with water borne diseases (Kuria & Dr. Mireri, 2010), displacement of people from the proposed dump sites (UNEP, 2013), regular social conflicts between members who get second hand sellable wastes from the dumping sites and many more (UNEP, 2009).

It can be argued that many African cities and Municipal councils lack the capacity to handle both the solid and non-solid waste generated daily by the ever increasing city dwellers. By extension almost all counties in Kenya lack the resources to manage solid waste as they struggle to fund social services in the entire counties. The solution to funding of large or overwhelming programs like waste management should be seen to be as important as the provision of infrastructure in these counties (Mutuku, 2013). This thus calls for various waste management projects just like the introduction of Public-Private Partnerships in the provision of social services, particularly in solid waste management would probably be the savior to this garbage handling problem in counties like Mombasa that have no proper waste management system.

In Mombasa for example, waste management projects have constantly been associated to social, health, economic, and a variety of further aspects of life in the urban areas. Inadequate or poor projects implementation in the management of waste from households or businesses can dent efforts aimed at preventing spread of diseases, discomfort, and economic development

(Municipal Council of Mombasa, 2008). With that realization the municipal council of Mombasa since the 2003 adopted measures that included PPPs in waste management, implementation of various projects that included moving the dumping site from the VOK area to Mwakirunge in Bamburi and adopting programs that brought in the NGOs, CDAs, KMA,NEMA and many more in availing resources for the implementation of various projects (Municipal Council of Mombasa, 2010).The general impact of these projects to the local residents of Mombasa has been: creation of jobs for both the waste handlers and those working in various plastic recycling plants (Mombasa County Report, 2014), provision of livelihoods to poor people through collecting and selling of dumped valuables (World Bank, 2013), availability of soil and water resources (Nyokabi, 2011), spread of diseases causing pathogens (Kasima, 2014), exposing of residents to mechanical hazards and chemical waste, and, the final issue has been that greenhouse gas emissions has resulted to non-composted organic waste (by its anaerobic decomposition) contributes to (Wairimu, 2014).

1.2 Statement of the Problem

In Kenya, waste is produced at a rate that outpaces the capacity to collect and dispose it of in a safe and environmentally sound manner in almost all of its urban centers (Mombasa city included) (NEMA, 2012).Wastes have ranged from minor litter in the urban centers that are not properly dumped in the designated dust pins to massive pollutants from the industries and human wastes not forgetting the garbage menace in urban centers like Nairobi, Kisumu, Eldoret, Mombasa and the Busia border town. This has not only attracted public outcry but for a long time has attracted international attention; a factor that has led to the implementation of various waste management projects in various parts of the country (GoK, 2012b).

According to Monyoncho (2013), a number of pollutants have attracted a number of issues that are aimed at developing strategies that are meant to address issues surrounding the implementation of programs for waste management. He continues to argue that, due to urbanization and population increase, a more severe issue besides the problem of littering which in most urban centers in Kenya is prevalent has been given birth to and projects aimed at checking this should be developed. The problem of plastic waste especially carrier bags- has been identified as and is health problems and an increasing number of environmental and health problems.

Waste collection and its transportation in Kenya is largely informal. Open dumping is the common waste disposal method being employed but there is very little recovery activities. The county government in Mombasa does not operate any composting plant where commercial waste recovery can be done, or where recycling could be carried or a transfer station. The contribution of the informal sector is complicated by the fact that the recyclables are mixed with the other wastes, both at the household level, industrial and at the dumpsite. A report by the Mombasa county government of 2014 has shown that, the county has been faced with three major issues that include; water, sanitation and waste management. This has attracted a number of initiatives like solid waste scheme that include PPTs, county government's initiative of coming up with movable dump pin trucks and many more (Mombasa County Development Report, 2014).

Studies have shown that, in Kenya, unlike the developed countries waste management programs have been very poor. The situation is worst in Mombasa and this has attracted a number of issues. According to World Bank (2010), the risks to human health and the environment due to improperly managed waste management projects are existent. Problems due to improper waste handling and uncontrolled dumping may lead to a range of problems, such as water contamination, attracting rodents and insects, and increase of flooding due to gullies or blocked drainage canals. To add to this, this may bring about safety hazards from explosions or fires. Increases in greenhouse gas (GHG) emissions due to poor waste management also contributes to climatic changes thus leading to death of various plant and animal species.

A study carried out by NCC- UNEP (2010) shows that, in Mombasa municipality- Kenya, waste management projects have brought a number of positive impacts to the locals. For example, the jobs have been created and livelihoods have been improved for the poor people, who operate by collecting the wastes and moving them to the various designated dumping sites, environmental diseases have been controlled by having specific points where wastes are deposited, and many more. However, the problem arises when the issues surrounding the implementation of various programs aimed at mitigating the effects of waste management in Mombasa County have never been researched on. In this realization, the research aims at establishing the effect of solid waste management projects on the welfare of the local community; a case of solid waste management

projects implemented in Mombasa County, Kenya.

1.3 Purpose of the Study

The main purpose of this study was to establish the effect of solid waste management projects on the welfare of the local community in Mombasa County, Kenya.

1.4 Objectives of the Study

This study sought to achieve the following objectives:

i. To examine how employment opportunities created by waste management projects affects the welfare of the local communities of Mombasa County, Kenya.
ii. To assess how health related problems created by waste management projects affects the welfare of the local communities of Mombasa County, Kenya.
iii. To determine how social conflicts created by waste management projects affects the welfare of the local communities of Mombasa County, Kenya.
iv. To examine how environmental pollution created by waste management projects affects the welfare of the local communities of Mombasa County, Kenya.

1.5 Research Questions

The study was guided by the following research questions:

i. How do employment opportunities created by waste management projects affect the welfare of the local communities of Mombasa County, Kenya?
ii. How do health related problems created by waste management projects affect the welfare of the local communities of Mombasa County, Kenya?
iii. How do social conflicts created by waste management projects affect the welfare of the local communities of Mombasa County, Kenya?
iv. How does environmental pollution created by waste management projects affect the welfare of the local communities of Mombasa County, Kenya?

1.6 Research Hypothesis

The study was guided by the following alternative research hypothesis:

i. H_1: Employment opportunities created by waste management projects have a significant effect on the welfare of the local communities of Mombasa County, Kenya.

ii. H_1: Health related problems created by waste management projects have a significant effect on the welfare of the local communities of Mombasa County, Kenya.
iii. H_1: Social conflicts created by waste management projects have significant effect on the welfare of the local communities of Mombasa County, Kenya.
iv. H_1: Environmental pollution created by waste management projects has a significant effect on the welfare of the local communities of Mombasa County, Kenya.

1.7 Significance of the Study

First, the research is anticipated to be beneficial to the society. By implementing various waste management projects, it leads to a healthy society because environmental pollution menace is addressed. Also there is a reduction of extreme effects associated with wastes both solid and non-solid. It is hoped that the findings of this study will help raise awareness on issues pertaining to waste management from community level to the national level.

The other category of beneficiaries is the policy makers. Policy makers and Mombasa county authorities may also make use of the findings of this study in their planning and policy formulation strategies. This may help come up with waste management projects implementations that have little negative effects to the local community. It will also help provoke rogue project handlers in the county and contract qualified waste management handlers thus yielding better waste management options that have little negative impacts with maximum positive impacts to the locals. It is therefore, anticipated that the study's findings herein may offer an insight on the role played by this waste management projects in helping or affecting the communities negatively through employing better environmental management policies.

It is also expected that the findings of the study may assist CBOs and NGOs operating in the Mombasa region and beyond to understand the impact of the activities coming out as a result of waste management and how the positive ones can be strengthened through partnerships and how the negatives can be minimized. NEMA may get the sufficient information required to control the number of projects that lead to either environmental pollution or any other pollution that could affect the lives of the Kenyans negatively.

Finally, researchers are expected to benefit. Academically, this research may generate fresh knowledge to researchers who wish to carry out further investigation on the issue with possible

recommendations on any areas in need of revisions. The study may also provide some baseline data that may guide future studies in accessing the impacts of waste Management projects implementation in Mombasa and in other Kenyan urban centers.

1.8 Limitations of the Study

Time was a limitation that faced the study. Time for classroom work, research, that at work, that for the family and that of linkage between the supervisor and the respondents was a big issue. Owing to the nature of the researcher's work, the time of the research and guidance by the supervisor at the campus will be highly in competition. The researcher works in central bank that never allows day time communication thus limiting the study times in most occasions. However the researcher took a leave and created personal time to link the supervisor and the respondents during the research times.

Financial resources were not only a limitation but a factor in the study. Limited resources delayed the achievements of the study. However the researcher got family support and by extension go for extra funding from the bank or any other institution when need arose.

The final limitation was that of the language barrier and the ignorance of majority of the people on the impacts of projects aimed at managing wastes. The Mijikenda communities living in the area have not been aware of these effects of various waste management projects within the county thus this compromised the results of the study. This was minimized by use of enumerators who helped in translations.

1.9 Delimitation of the Study

The study delimited itself by concentrating on the effects of waste management projects to the welfare of the people of Mombasa County. It also narrowed the scope of the study to areas affected by waste management projects in Mombasa County like Mwakirunge, VOK and many more.

Another way, the study limited itself to the solid management projects that have been handled by either municipal, town council, solid management companies for the last 5 years so as to get quality information.

The study finally focused on only four aspects of effects on the community's welfare; jobs creation, environmental pollution, social conflicts and health issues.

1.10 Basic Assumptions of the Study

The research was carried out with the basic assumption that there were a number of waste management projects that have been implemented in Mombasa County for over 5 years and their records exist in the county offices.

Another assumption was that, the respondents were willing to give information (including the most sensitive one) without any bias and subjectivity that could compromise the results. Finally the research had the assumption that the impacts from waste management in Mombasa County have tied themselves to the four objectives.

1.11 Definitions of Significant Terms

A community- This is the sharing of common values by a social unit of any size. Though exemplified by face-to-face, the sizes of these communities are commonly small, larger or more expanded communities such as the national, international, and virtual community are also deliberated on. Belief, intent, preferences, needs, resources, risks, and a host of more conditions may be common and in existence thereby affecting the participants degree of cohesiveness and identity.

Education- it is a form of learning where the skills, beliefs, knowledge, habits, and values of a group of people conveyed through storytelling, discussion, teaching, training, and or research from generation to generation. Educational experience is that which has a influential effect on how one acts, thinks, or feels. It might also include informal transmission of such information from one person to another. Frequently it takes place under the guidance of others, but learners may also educate themselves (autodidactic learning). Any experience that has a formative effect on the way one thinks, feels, or acts may be considered educational.

Employment- it's a relationship amongst two parties, where one is the employer and the other is the employee ordinarily centered on a contract where one's work is paid for.

Environmental pollution- it is the unwanted alteration in chemical, biological, and physical characteristics of the water, air, and land we inhabit. Due to rapid industrialization, over-

population, and other man actions like deforestation, and agriculture etc., the earth has became overloaded with various pollutants released as by-products.

Social conflict- it is the struggle for power or agency in society. Social or group conflict occurs where there are two or more actors that oppose each other in their social interaction, by reciprocally applying social power to try and attain scarce or incompatible goals to prevent the challenger from attaining the same resources.

1.12 Organization of the Study

This research proposal is organized into three chapters. Chapter one provides the introduction that includes the background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, statement of the problem, purpose of the study, objectives of the study, research questions, research hypothesis, significance of the study, delimitations of the study, basic assumptions and the definition of significant terms. Chapter two of the study consists of the literature review with information from other articles which are relevant to the researcher. The third chapter will include the research design, population and sample, data collection procedures, data analysis procedures and the test for reliability and validity. Chapter four will present the analyzed data and a summary of the data thematically according to the objectives. Chapter five will present the summary of the findings, discussions conclusions and recommendation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews and critically analyses available literature on effects of solid waste management projects to welfare of the society from the global, regional, and local perspectives. Literature on concept of solid waste management, employment opportunities, health related problems, environmental pollution and social conflicts which form the core objectives will be reviewed. Theoretical and a conceptual framework is also developed to show the relationship between the study variables.

2.2 The Concept of Solid Waste Management

Since the start of life in the world, history shows that waste control and management has never been is never and shall never be avoided. In this way, a number of ancient scholars and the modern scholars in environmental management, IT and many more have dwelt in waste management with the ever increasing industrialization activities and doubling population after every century. According to Regional Centre for Urban and Environmental Studies (2014), Solid Waste Management (SWM) is a process that involves the collection, storage, transportation, processing and discarding of solid refuse residuals in an engineered sanitary landfill. This process is integrated and comprising of several collection methods, storage, various transportation equipment, recyclable material from recovery mechanisms, reduction of waste quantity and volume using approaches such as composting, waste-to-power and disposal in a designated engineered sanitary landfill.

The source and quality of waste produced influences the selection of a suitable SWM process. Solid waste is generated from a number of sources which include households (kitchen and yards), commercial areas such as hotels, shops, and eateries, industries (packaging and raw material), institutions such schools, offices, and schools, demolition sites and construction, animals that are domesticated and wild (manure, carcasses of dead animals), streets (sand, silt, clay, concrete, bricks, asphalt, residues from air deposition and dust), parks (leaves from trees , fallen branches) etc. (IPCC, 2012).

In his work entitled, "Waste Management Practices," Davidson (2011) started by giving a simple definition of the waste management idea and later on the brief history of the evolution of the waste management idea so that one can easily understand the concept. According to him, management of waste is the combination of undertakings that include: collecting, transporting, treating and disposing of waste; monitoring, controlling, and regulating of production, transport, collection, treatment and disposal of waste; and prevention of waste production through in-modification process, recycling and reuse. Science Direct (2013) maintains that, waste management commonly refers to all kinds of waste, that are either produced when extracting of raw materials, processing of raw materials into intermediary and finished products, usage of end products, or human activities, such as agricultural, special (sewage sludge, health care, household hazardous wastes), and municipal (residential, institutional, commercial).

According to United Nations Environmental Programme (2013), management of waste is intentioned to minimize the effect of waste on environment, aesthetics, or health. Waste management include: waste generation, removal of waste, minimization of waste, transporting waste, treating waste, reusing and recycling, storing, collecting, landfill disposal, financial and marketing aspects, environmental considerations, policing and regulating, training and educating, implementation and planning. Still, management of waste practices are not identical amongst both developed and developing nations, urban and rural regions and residential and industrial sectors.

According to National Waste & Recycling Association (2013), during the course of history, the quantity of waste than humans have generated wasn’t significant as a result of the low density and low levels of societal exploitation of natural resources. Waste that was frequently produced during pre-modern times was mainly human biodegradable waste and ashes, and these got released back locally into the ground, to result to lessening of the environmental impact. The tools having been made from metal or wood were usually reused or passed down through the generations. Nevertheless there are some of the civilizations that seem to be more profligate in producing waste than the others. Particular, in Central America, the Maya had a fixed ritual monthly, where those in the village would come together to burn their rubbish in large dumps.

A report by World Bank (2010) shows that, the industrialization onset and sustained growth of large population urban centers in England, the accumulation of waste in the cities caused a quick deterioration of the general quality of urban life. Filth due to the lack of waste clearance regulations choked the streets. Demands for waste removal powers through the establishing of a municipal authority took place as early as 1751, when it was proposed by Corbyn Morris in London that "...as the preservation of the health of the people is of great importance, it is proposed that the cleaning of this city, should be put under one uniform public management, and all the filth be...conveyed by the Thames to proper distance in the country".

Unlike developed countries, a study by Mutai & Njoroge (2012) shows that in most developing countries it is the urban authorities that is responsible for waste management. Waste management is one of the most visible urban services whose effectiveness and sustainability serves as an indicator for good local governance, sound municipal management and successful urban reforms. Waste management therefore is a very good indicator of performance of a municipality and in most case has been valued as an indicator I political swing waves in Africa.

Management of waste management in town centers in East African region has been centralized for a long time (Napoleon, Momodu & Joan, 2011), imported refuse truck are used (Oyeniyi, 2011) that collect wastes from transfer points or from sources and transfer to designated waste dumps. Municipal solid waste management (MSWM) system in East Africa that has changed from the colonial days in the 40s, 50s and early 60s when it was efficient due to the lower urban population and the adequate resources (Oyeniyi, 2011) to the current status that shows inefficiencies. The waste management system that is centralized has evolved into the current management mixtures that include private sector involvement and as well as decentralization.

The storage, collection, transportation and final treatment/disposal of wastes are reported to have become a major problem in urban centers (ADB 2002 cited in Willy Kipkoech, 2014). The composition of wastes generated by the East African urban centers is mainly decomposable organic materials based on the urban community consumption that generates much kitchen wastes, compound wastes and floor sweepings (Stringer, 2014). This calls for efficient collection system to avoid health, aesthetics and environmental impacts. The global trend of increased use

of electrical and electronic goods is also evident in EAC where E-waste is becoming a significant threat to the environment and human health in EAC urban centers (NEMA, 2010; UNEP, 2010).

2.3 Employment Opportunities and Welfare of the Local Community

Globally, studies have shown that waste management projects have been central in creating employment for both the poor Ghetto dwellers, the middle class who get jobs in various industries that recycle waste and finally the wealth company's owners who run a number of companies that manage the wastes. In his study in the densely populated Asian countries, Sakai *et al* (2011) observe that the informal sector undertakes most recycling of MSW in India as a form of employment. The formal recycling set-up in India in a minor fraction and is only in its initial stages, experimenting different models tough takes care of both the aged and young non-employed people in India.

Sakai *et al* (2011) continue to show that, the waste pickers (WPs), itinerant waste buyers, dealers and recycling units do most of all the recycling in India which is entirely the informal sector. The largest population in the informal sector is comprised of the WPs; meaning that this is a group of non-skilled people that include street children and OVC who pick the waste papers, plastic bottles, e-wastes, and many more for sale. Generally, recyclables are collected in two ways; paper, glass and metal are collected before they enter the MSW stream from households on an instant payment basis, by a special group of people called 'Kabariwala' (from here on referred to as itinerant waste buyers) and plastics are generally collected by waste-pickers from litter on streets or from heaps of waste in landfills (Niringiye & Omortor, 2010). Shopkeepers sell recyclable items, such as newspaper, cardboard, glass containers, tin cans etc. to itinerant waste buyers too. Waste pickers retrieve recyclable materials like milk bags, plastic cups and containers, glass, etc. from what is discarded by households, commercial establishments and industries. Larger commercial establishments and industries sell the recyclable waste (source separated or otherwise) to waste dealers in bulk, who then sell it to recycling units (MDG Report, 2013).

While studying the role of waste management companies to the lives of the poor locals in Pakistan, Haiti and Lesotho, Jakub et al. (2011) argue that, The informal recycling sector in

India, Pakistani, Haiti, Lesotho and elsewhere in the developing countries has benefits that includes: supplementing the formal system and subsidizes it financially, it also generates employment to a substantial share of the population both at the professional level, skilled, non-skilled and the neglected humans like street boys and drug abusers, it competitively operates with high efficiency levels, operating profitably producing surplus, at some point linking up with formal economy in the recycling chain, by making recycling possible and thus reducing the extraction and use of virgin raw materials etc thus offsets carbon emissions.

In their writing, Xavier et al. (2010) focused on the usefulness of solid waste management projects especially those handled the recyclable plastics in the urban centres in Kenya, Uganda and Tanzania to the locals. For example, Plastics, due to its advantages like its durability, lightness, and ease to be molded, is used everywhere by most people and can easily be picked by the disadvantaged and the advantaged in the society to earn them a living. In Dodoma, Shinyanga, Tabora, Nairobi, Isiolo, Nanyuki, Jinja, Kamplala and Mbale, waste plastics were found to be useful in many areas. For example: In domestic purposes whereby they are used as carry bags, pet bottles, trash bags, containers; In air, road, rail travel: As cold drink or mineral water bottles, plastic plates, cups; In hospitals: As glucose or other IV fluid bottles, disposable syringes and injections, catheters, wine bags, gloves; In shops and hotels: As packing items, plastic bags and disposable utensils. According to them, this has enabled a number of citizens in countries get a number of opportunities while these plastics for example are recycled.

GPRB (2010) report has outlined a number of areas where waste management has created jobs for the locals in two countries-namely Kenya and India. One specific area where jobs are created for the locals by the waste management projects is on the onsite handling, processing and storage. In Jalandhar city India and Nairobi City of Kenya for example, most of the habitable/residential areas have limited storage spaces. In these areas, the waste is of mostly of a biodegradable nature. This dumping is normally done by non-skilled employees in companies or homesteads like the house maids, cleaners and many more.

Another point where jobs for the people are created is at the Handling phase. This refers to the activities associated with managing SW until they are placed in the containers used for their

storage before collection or return to drop off and recycling centers. According to the World Bank (2013) for example, waste handlers in Manila and Nairobi are casual laborers who are employed to load the waste into municipal vehicles, other credited waste management companies' vehicles, personal carts and many more. Nyaga (2014) notes that in Mombasa just as the situation is in other parts of the country, a number of projects have been initiated by the county government that has distributed waste handling trucks at various points where individuals are to empty their waste into. He further argues that in cases where the trucks are far from the residents, the MCAs have partnered with village administrators and distributed Carts (mikikoteni) that are under a group of 10 jobless youth per cart so that they can earn a living from it.

Solid waste segregation is another point where both employed people work at and the self-employed ones. Studies in Kenya's Kisumu, Nairobi's Dandora Dumping site and the Jomvu Dumping site in Mombasa have shown that SW is not segregated; rag pickers collect SW from the streets, bins and deposit sites. Storage spaces are not often adequate. People drop the SW outside the bins. This has led to the creation of jobs to the youths and other people employed at the waste management firms/NGOs/CBOs so as to come up with ways of trying to sort out the waste. In normal occasions, the UNEP waste picking points in Nairobi and Mombasa for example have created over 2212 youths especially the street children who segregate/sort out the better valuable items like e-waste, plastic bottles etc. which they later sale (Maloba, Nelson Isaac, 2012).

Afroz & Masud (2011) looked at the importance of waste collection Kuala Lumpur, Malaysia and Nairobi, Kenya and argued that: SW that is collected from the bins from every point and collection from residential areas is carried out daily as the organic matter decomposes rapidly due to a hot climate being witnessed due to climate change. They continue to argue that, this collection of waste has created jobs for over 12% of the street children in the tow capital cities; a number of whom have come up with structured organisations.

Another area according to Banga (2011) where jobs are created due to SW management is in the Transportation section. Transportation means 'transfer' of SW from the storage place to the

dumping ground. For this purpose, vehicles are dependent on the physical layout of the roads and the cost of manpower available, maintenance provisions, truck tippers, tractor trailer, etc. that are used for final transportation of SW to the site. About 350 TPD waste is generated on a daily basis in the Nairobi's capital city for example and about 297TPD in the Mombasa County. This means that over 120 vehicles/trucks and other movables are engaged in the transfer of this waste. This leads to jobs held by drivers, turn boys, loading and offloading people and many more. They also argue that waste recycling companies have created jobs as seen in the case of fertilizer and plastic recycling companies that have been given birth due various WM projects in the country.

2.4 Health Related Issue and Welfare of the Local Community

According to Role (2013), the generation of waste and the collection, processing, transport and disposal of waste—the process of 'waste management'—is important for both the health of the public and aesthetic and environmental reasons. Waste is anything discarded by an individual, household or organization. As a result waste is a complex mixture of different substances, only some of which are intrinsically hazardous to health. The potential health effects of both waste itself and the consequences of managing it have been the subject of a vast body of research.

In their work (The Practice and Challenges of Solid Waste Management in Damaturu, Yobe State, Nigeria; Tennessee, USA, and, Soweto, SA), Babalola et al (2010) elaborated on hazardous substances associated with waste management projects. According to them, environmental monitoring of all potential sources of pollution from different waste management options/projects has been, and is being continuously, carried out and thus a great deal is known about the types and amount of substances emanating from them. Whatever the waste management project, it is generally the case that: (a) there are usually a large number of different substances; and (b) only a few of these are produced in any quantity with many being at extremely low levels.

Gases emitted from landfill sites in the study areas for example, consist principally of methane and carbon dioxide, with other gases, such as hydrogen sulphide and mercury vapour being emitted at low concentrations, and a mixture of volatile organic compounds (VOCs) comprising approximately 0.5%. A WHO exposure assessment expert group suggested that priority

pollutants should be defined on the basis of toxicity, environmental persistence and mobility, bioaccumulation and other hazards such as explosives (Leedy & Ormrod, 2010). In addition to the substances above, they suggested that landfill site investigations should consider metals, polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), chlorinated hydrocarbons, pesticides, dioxins, asbestos, pharmaceuticals and pathogens.

According to Napoleon, Momodu & Joan (2011), Waste incineration also produces a large number of pollutants from the combustion of sewage sludge, chemical, clinical and municipal waste, which can be grouped as particles and gases, metals, and organic compounds. Ten pollutants considered having the greatest potential impact on human health based on environmental persistence, bioaccumulation and amount emitted and/or on inherent toxicity were cadmium, mercury, arsenic, chromium, nickel, and dioxins, PCBs, PAHs, PM10 and SO2. Microbial pathogens are a potential source of hazard, particularly in composting and sewage treatment but also in landfill. Dust and the production of particulate matter are produced in landfill, incineration and composting processes and by road traffic involved in all waste management projects. Less easily quantifiable hazards, which might nevertheless impact on the population near a waste disposal site, include odour, litter, noise, heavy traffic, flies and birds.
In their study, Coffey & Coad (2010) worked on a journal entitled, 'An analysis of the household solid waste generation patterns and prevailing management practices in Eldoret town, Kenya; Jinja town, Uganda and Dodoma City; Tanzania.' In their literature, they touched on the Impact of waste management practices on health. According to them, there is a large body of literature on the potential adverse health effects of different waste management projects, particularly from landfill and incineration. Many of the substances, such as cadmium, arsenic, chromium, nickel, dioxins and PAHs are considered to be carcinogenic, based on animal studies or studies of people exposed to high levels. Evidence that these substances cause cancer at environmental levels, however, is often absent or equivocal. In addition to carcinogenicity, many of these substances can produce other toxic effects (depending on exposure level and duration) on the central nervous system, liver, kidneys, heart, lungs, skin, reproduction, etc. For other pollutants such as SO_2 and PM10, air pollution studies have indicated that there may be effects on morbidity and mortality at background levels of exposure, particularly in susceptible groups such as the elderly. Chemicals such as dioxins and organochlorines may be lipophilic and accumulate in fat-rich

tissues and have been associated with reproductive or endocrine-disrupting endpoints (UNEP, 2012).

According to World Bank (2012), Landfill sites due to SW management projects initiated by various governments in both the developed countries and the under developed countries have brought about Birth defects and reproductive disorders. Reproductive effects associated with landfill sites have been extensively researched and include low birth weight (less than 2500 g), fetal and infant mortality, spontaneous abortion, and the occurrence of birth defects. Prüss-Ustun, et al. (2013) found increased incidence of low birth weight in the populations around the Love Canal site USA for example, the former during the period of active dumping (1940–1953) and the latter among house owners (although not among those renting) from 1965 to 1978. A similar increase in the proportion of low birth weight babies was found in those living within a radius of 1 km of the Lipari Landfill in New Jersey, particularly in 1971–75 following a period of heavy pollution of streams and a nearby lake from leachate from the site. Trends in low birth weight and neonatal deaths were found to correspond closely with time and quantities of dumping at a large hazardous waste disposal site in California, with significantly lower birth weights in exposed areas than control areas during the periods of heaviest dumping. It should be noted that exposed areas were defined according to the number of odour complaints rather than any more objective measure.

However, a geographical study of adverse birth outcomes associated with living within 2 km of a landfill site between 1982 and 1997 in Great Britain found a significantly excess risk, which increased during operation or after closure compared with the risk before opening. An interesting finding from this study was that 80% of the population in Great Britain lives within 2 km of an operating or closed landfill site. A study of 21 European hazardous waste management sites found that residence within 3 km of a site was associated with a significantly raised risk of congenital anomaly, with a fairly consistent decrease in risk with distance away from the sites. Risk was raised for neural-tube defects, malformations of the cardiac septa and anomalies of great arteries and veins. A study by the same group showed similar increases in chromosomal anomalies, even after adjustment for maternal age. Similar results have been found in developing countries with SW management projects being designed and erected in peri-urban points that

have great numbers of people, This has been through in the slums of Eretria, Kenya, Tanzania's Da-es salaam slum, two slums in the western parts of Accra Ghana and many more (Stringer, 2014; The World Bank in Ghana, February 4, 2013; Oduor, 2012).

According to Odour (2012), Cancer has been the 21st century headache in Kenya just like any other LDC in sub-Saharan Africa due to poorly coordinated and implemented SW Management programmes. He shows that, several geographical comparison studies have investigated cancer mortality and incidence around waste sites like Dandora in Nairobi (the largest dumping site in Kenya), Bonyando in Kisii, Kondele in Kisumu, and Jomvu in Mombasa. Increased frequency of cancers in the country due to hazardous waste sites have been associated with the chemicals emitted into the air, some flowing into underground water while others alter the climate; thus affecting the surrounding populations.

In the similar spirit, Kinyanjui (2014) argue that many of the studies investigating health outcomes other than birth defects and reproductive orders and cancers have been community health surveys and have relied on the self-reporting of symptoms through interviews or questionnaires in Mombasa in relation to health issues to the communities as a result of SW management programmes. The health problems investigated include respiratory symptoms, irritation of the skin, nose and eyes, gastrointestinal problems, fatigue, headaches, psychological problems and allergies. It has been suggested that evaluation of a relationship between these symptoms is complicated by confounding stress, public perception of risk, odour and nuisance related to the site, and recall bias. For example, a survey in 2010 in Changamwe, Mwakirungi, VOK, and Likoni found that residents who indicated they were worried about pollution reported more symptoms than those who were not worried, both in the exposed and control areas. Due to the numerous literatures, the study specifically indicates to explore the aforementioned health issues.

2.5 Environmental Pollution and the Welfare of the Local Community

Kuria & Mireri (2010) have given a definition of pollution. Pollution is the introduction of contaminants into the natural environment that causes adverse change. Pollution can take the form of chemical substances or energy, such as noise, heat or light. Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants.

Pollution is often classed as point source or nonpoint source pollution.

Rich literature exists across the globe in relation to the environmental effects as a result of SW management by various bodies in the world. According to Zhuang, Wang, Wu & Chen (2010) one major environmental issue associated with the private and municipal SW management projects in China today is the issue of surface water contamination. They argue that, in the eastern parts of the country for example, Waste that end up in water bodies negatively change the chemical composition of the water. Technically, this is called water pollution. This will affect all ecosystems existing in the water. It can also cause harm to animals and families that drink from such polluted water. This has been confirmed by Stringer (2014) water pollution is a major challenge as a result of SW management programmes operating in India, Pakistani, Malaysia, Ecuador, Ghana, Nigeria, Ethiopia and Kenya today. According to him, unsanitary landfills for example contaminate surface and ground water resources when the leachate created percolates through the soil strata into the underneath groundwater or during rains it is washed as runoff. Leachate is commonly a strong reducing liquid formed under methanogenic (anaerobic) conditions. The content of various constituents in the dumped waste give the characteristics of leachate (GoI, 2013).

Studies on Environmental Quality in and around Municipal Solid Waste Dumpsite in Kolkata, by World Bank (2010) found that areas managed by municipal waste control project initiatives had moderately high concentrations of heavy metal in groundwater surround the dumpsite. The study found out that the groundwater quality has been significantly affected by leachate percolation.

Similar studies by UNDP (2011) in Lesotho's capital city, Kenya's Nairobi, and Uganda's capital city Kampala highlighted on the role of SW management projects implementation and the associated environmental pollution with a specific bias to ground water pollution. In Nairobi and Kampala for example, the study touched on Leachate. It showed that Leachate usually contains organic chemicals formed by heavy metals leached from inorganic wastes and anaerobic digestion of organic wastes. The heavy metals generally observed in leachate are Cadmium (Cd), Chromium (Cr), Lead (Pb), and Nickel (Ni).

All these heavy metals are characterized as toxic for drinking water. Due to the reducing property of leachate, during percolation through soil strata, it reacts with Iron (Fe) and Manganese (Mn) species underground and reduces them into more soluble species, thus increasing their concentrations in groundwater Nyokabi (2011). Such reactions when they occur, pose a serious drinking water toxic risk. These predictions are substantiated by studies which found high concentrations of Cr, Cd and Mn in groundwater due to leachate percolation. Nitrates present in the environment can also be reduced to nitrites due to leachate. Nitrites consumed through drinking water can oxidize haemoglobin (Hb) in the blood to methaemoglobin (met Hb), thereby inhibiting the transportation of oxygen around the body (Habitat International, 2010). The study clearly establishes that waste landfills in Nairobi, Kampala and elsewhere are potential sources of heavy metals contamination in groundwater sources adjoining the landfills. It also points out that there is an urgent need to adopt credible solutions to control water pollution due to indiscriminate dumping of wastes.

Lilia & Casanova (2010) in their work, Assessing the Range of Options for PPP in Expanding Waste Management Services in Developing Countries, have touched on an issue caused by the various projects managing the SW and how they have led to soil contamination in countries like Ethiopia, Philippines, Kenya, Angola and Nigeria. According to them, hazardous chemicals that get into the soil (contaminants) can harm plants when they take up the contamination through their roots. If humans eat plants and animals that have been in contact with such polluted soils, there can be negative impact on their health.

In relation to the above, UNEP/NEMA (2010) did a comparative study of economic management of solid waste in the three major cities of Kenya and the 3 major urban centers in central India, that had a sub-section that highlighted on land degradation and scarcity in 2010. According to the report, a common waste management practice by the various projects and initiatives that are put forward to control and manage SW and also it is one of the cheapest methods for organized waste management firms in many parts of the world is landfilling of municipal solid waste (MSW. This practice of unsanitary landfilling in addition to occupying precious land resources near urban areas, it degrades the soil and quality of the land in the site. The occurrence of heavy metals and plastics in the soils make it unfit for agriculture and results to emissions of methane

and structural instability of the land thus making it unfit for construction activities. It would therefore, require substantial remediation efforts which are infrastructure intensive, and time consuming to make the land useful. Vast amount of lands near urban areas are occupied by landfilling.

TERI (The Energy Resources Institute, earlier Tata Energy Research Institute) study in 1998 titled 'Solid Waste Management in India: options and opportunities' found that the size of land that all the waste occupied had been generated until 1997 in India post-Independence. It compared the land that has been occupied by the waste came to the size of 71,000 number of football fields of solid waste, which are stacked to the height of 9 meters. The study estimates that the waste generated occupy 237.4sq.km or half the size of Mumbai, by 2011 it would have occupied 379.6 sq.km or more than 218,000 football fields or 90% of the fourth largest Indian city area-wise, Chennai,; by 2021 would need 590.1 sq.km which is greater than the largest Indian city area-wise, the area of Hyderabad (583 sq.km) based on a business as usual (BAU) scenario of 91% landfilling (UN-HABITAT, 2010).

The Ministry of Finance in 2009 published the Position Paper on The Solid Waste Management Sector in Kenya, approximates a requirement of more than 1400 sq.km of land for solid waste disposal by the end of 2047 if there is no proper handling of MSW. This is equal to the area of Thika and Nairobi combined. NEMA and Central Pollution Control Board surveyed 17 cities out of 59 in 2010 have proposed new sites for landfills in all the major municipalities in the country with specific emphasis on the Nairobi SW management dumpsite being relocated from Dandora. For example (23.4 million TPY) 24 municipalities and town councils use 34 landfills for dumping their waste, this covers an area of 1,900 hectares. Due to this, soils have been contaminated that could be used for food production and many useful areas and later on in life could cause for crisis to local population like lack of land for settlement, agriculture and play (NEMA, 2013).

In another study by County report (2014), Pollution has been cited as a major environmental issue associated with SW management projects in Kenya. The reports shows that, poor waste management practices can lead to air and land pollution and can result to respiratory problems

and further negative effects on health when contaminants get absorbed from the lungs to other parts of the body. It adds that when improperly disposed of solid waste can be a hazard to the environment in that the surrounding environments as well as the fish are affected. This unsuitable damping can lead to death of fish as well as diseases to man e.g. dysentery, cholera and so on. Some of these wastes can also be very harmful to the atmosphere. These wastes when improperly dumped into the atmosphere can lead to the destruction of the ozone layer and may cause diseases such as cancer. As a result there is problem in global warming. Air pollution can also lead to formation of acidic rain which is dangerous to crop life since it fastens the removal of soil fertility from the surface of the ground.

According to Ndumbu (2013); Ministry of Devolution and Planning (2014), the ever environmental issues of flooding during heavy rains experienced in Mombasa, Nairobi and other parts of the country are due to poor SW management especially the plastics by the SW management firm/companies. According to him, it affects drainage, whereby, when solid wastes are dumped in drainage channels and gutters, the block the flow of the sewerage. This may cause flooding. At the same time, solid wastes also affect soil drainage which hinders the growing of crops. A similar study by since some of the waste materials are water proof, they can be dangerous to the aeration system of the soil hence hindering agriculture. It also leads to the reduction of fertile cultivatable land in form of dumping sites. This in turn affects the country's local people since Kenya depends on agriculture for exports.

Maloba (2012) did a study of the effects of the SW projects to the environment and the negative influence of the people of Kisauni, Likoni, Changamwe, Ukunda and Malindi and discovered that: Waste materials like toxic if consumed by animals are very dangerous to life and worse still if these wastes are dumped in water bodies. They are dangerous to aquatic life; Poor solid waste has also for long led to the death of animals (especially domestic animals). Death of animals like cattle leads to poverty and the death of animals like dogs, leads to insecurity in homes; Poor waste management displays an ugly scenario of the environment. This can affect the tourism industry, as the tourist may not get attracted to visit the country; Uncontrolled damping of solid waste has for long led to wastage of land where we find lots of land being used as damping sites for wastes. These same pieces of land are later on neglected by the inhabitants of the area.

2.6 Conflicts and Welfare of the Local Community

A study by Eurostat (2010) focused on Bogota, Colombia in 1994 to 1996 conflict handling between informal and formal private sectors in contracting Municipal Solid Waste management services. According to the study, Bogotá, which is Colombia's capital, has a 7 million population that includes the metropolitan areas. This city generates on average 6000 metric tons of MSW daily. Initially, MSW management programs/services such as collection, transport, recycling and disposal were wholly taken care by the city authority with poor results. The first attempt to streamline MSW management services in the city was initiated by the Asociacion de Recicladores de Bogotá (ARB). ARB is an association of recyclers that was formed in 1990. The Association resulted from the coming together of four recycling cooperatives that wanted to be recognized for their services. Currently, 24 recycling cooperatives in the city of Bogotá are members of ARB.

The city authority did not meet the demands of EDIS and went ahead with the privatization process. Between 1994 and 1996 various private entities provided public waste services in Bogotá. The services were shared jointly by EDIS (45 per cent), private entities (45 per cent) and a foundation (Fundacion Social), and provided support to recycling organizations across Colombia. ARB was contracted to provide 10 per cent of the waste management services of the city. During this time, EDIS was also in the process of being liquidated. It was completely shut down in 1996, leading to 100 per cent management of public waste management services (collection, transport and final disposal) by private entities. During the privatization process, city authorities were faced with opposition from ARB since the Association was unable to compete in the tendering process. ARB did not meet the qualifying criteria outlined in the policy for contracting private entities for residential public services in Colombia, which allowed only stock holding corporations to compete (Sinha, 2010).

A report published by Yu Dawei (2012) about the Chinese protests shows that, since early 2008, China has seen a frenzy of investment in controversial garbage-incineration plants. In the words of Zhang Yi, head of the Shanghai Environmental Sanitation Engineering Design Institute, the sector has been and is still experiencing an eight-year golden era, set to continue through the 12th Five-Year Plan period, which ends in 2015. According to Zhang Yi's calculations, there

were 10 protests against incinerator projects between June 2007 – when locals objected to a SW management project at Liulitun in Beijing – and January of 2008. Three of these were in Beijing, three each in Jiangsu and Guangdong and one in Shanghai.

According to the Ministry of Environment (2010), there were four key reasons for such protests. First, existing SW projects were of a low standard and poorly run, and as a result created fumes and foul odours. Second, land and property prices have been and are steadily rising, leading residents to expect more of their local environment. Third, people are scared of dioxins, harmful chemical compounds that can be released during uncontrolled waste incineration (although he believes that this danger has been exaggerated). And fourth, in the past, local governments have failed in their duties during tendering processes, meaning badly managed companies have ended up operating plants.

Setting standards for waste-burning plants has also proved challenging. Incineration capacity is expanding rapidly, but from a very low starting point, said Wang Qi, head of the China Research Academy of Environmental Sciences' Institute of Solid Garbage Pollution Control Technology. There is a wide variety in materials burned – the plants basically use whatever gets delivered, which presents serious challenges for pollution control, Wang said. Despite the launch of so many incineration projects, there are still no clear regulations governing how the plants should be operated and pollution prevented. China's Ministry of Environmental Protection is drafting new standards for pollution control, but has already missed a planned publication date of 2011 (Dawei, 2012).

In Uganda, a study by Role (2013) shows that, Waste dump sites receive mixed wastes of various origins that include domestic, industrial, medical and commercial wastes. The waste dumps pose real hazard to workers, waste pickers and stray animals that visit the sites. Most of the waste workers do not wear proper protective gears. Also, the openness of landfill sites provides free access to waste pickers to sort valuable items for sales. Waste pickers work under no clear control and do not follow any safety and health regulations. Waste collection workers also pick out wastes of value en route to the landfills and sell them to middlemen. The major wastes picked are plastics (e.g. jerry cans, bottles, plates, and basins) and paper and cardboard.

Achankeng (2003) cited by United Nations Population Division (2011) argues that as the waste pickers get more organized through formalization of operation conflicts with formal collectors ensues especially regarding areas of operation. He reports such conflicts in Cameroon and quotes Kamel (2001) for such conflicts in Cairo. Such conflicts however could be avoided if urban councils formalize all waste operation activities and set clear rules of operation whereby zones of operation and all other requirements are strictly adhered to.

A study by Coffey & Coad (2010) shows that, more often than not, the urban poor have to make do with living amid waste despite the health risks; child mortality in the slums is 2.5 times higher than in other areas of Nairobi, according to the UN World Health Organization (WHO). In the Mathare slums, for example, the sight of children playing among plastic bags full of human excrement, referred to as "flying toilets", is common. These flying toilets are just polythene bags whereby the waste is put and thrown at far distances. This has left number of individuals with conflicts that could range from small quarrels to major wars (WHO, 2012).

While doing a research on the doom of poor solid management by various bodies in Kenya NCC- UNEP (2010) argue that, in Kenya's towns of Kisumu, Naivasha, Nairobi and Mombasa, Poor waste management has been a source of under development around the societies surrounding that particular area. According to them, poor solid waste management by various firms and poor dumping in areas like Mathare, Dandora, Kondele, Kisauni, Jomvu-Changamwe, etc. cause harm to tourist industries whereby tourists tend to shy away from dirty/vulnerable areas. Naturally, extreme poverty incidences have been associated with social crimes like mugging, prostitution, robbery, unnecessary wars, drugs and substances abuse as witnessed in areas like Kisauni, Nairobi's slums like Dandora, Mathare, Kariobangi etc.

In another study by UNEP (2013) shows that, a number of issues like contractual wars and the assigning of contracts has existed for long now in Kenya in relation to SW management. This has left a number of contracts landing into private firms that have little manpower and resources to manage the SW projects due to corrupt deals and nepotistic contract signings. This has been reported in Town like Thika where the contractors themselves incite their employees to rise against each other-2011, in Kisumu and Mombasa whereby various west pickers who felt that

they initially owned the zones of west collection and many more.

Nyokabi (2011) argues that, in Mombasa just like it has been happening in Nairobi's dumpsite of Dandora, frequently, there have been reports of enmity, hatred, wars and at times demonstrations from various groups of waste pickers from the various waste management sites in the towns. In Dandora for example, wars have been experienced between the various north and south gangs once one gang collected recyclable waste beyond the boundaries put. This has often led to gang wars between the groups; incidences that at times involve gun fights. In Mombasa though minimal, a number of wars have been reported due to disagreements between the waste pickers in the county. However the literature about the conflicts is limited and this research is towards enriching the information (Oduor, 2012).

2.7 Theoretical Framework

This sub-section presents the theoretical approach from institutional analysis according to Scott (2001) cited by Amfo-out et al (2012) and Capacity Building according to Lesley Rushton (2011). Due to the nature of the setting of the research, the researcher adopted the Principles of urban ecology theory. Urban ecology, which in German is known as Stadtökologie, embodies the idea that humans influence the natural environment in their cities.

This theory originates from the "biology notion of the interaction of living things and their environment" in times were cities were not considered a study field for ecologists, biologists and environmentalists (Marcotullio *et al*, 2003cited by Kim, 2014). This belief emerges from the natural sciences domain in European countries and was put forward by scholars who wanted to demonstrate that humans living in cities had similar interactions with nature as plants in their own ecosystems by using the principles of ecology (Tan Yen Joe, 2012).

The idea that cities were indeed ecosystems also provided the possibility to re-examine cities and to add other components to biotope and ecological interpretations (Sukopp, 1998 cited in Wang, Yoonhee and Kamata, 2011). Namely, studies regarding human behavior and its impact on the natural environment, and explorations on urban growth and its influence on the transformation of land can be included as an extended study format under the concept of urban ecology. Sukopp and Wittig offer two definitions of urban ecology: Biological standpoint, whereby, Urban

ecology is a branch discipline of ecology and deals with biocenosis, biotopes, ecosystems, their organisms, and the conditions of their habitats, as well as structure, function, and history of urban ecosystems (1998). Integrated standpoint is another definition of, whereby, Urban ecology in its broader sense is an integrated field of research of scientists from various fields and of planning with the goal of improving quality of life and a long lasting ecologically sound urban development (Dawei, 2012).

These statements are somewhat different from the views of Chicago scholars such as Park and Burgess who have developed a sociological approach based on the views of space competition and social characterization. They suggested that cities were environments similar to nature, influenced by different forces. One of them is the competition of different groups for physical space and the distribution of individuals in different “colonies”. The authors compare “natural areas” to “areas of population segregation”. Their definition of human ecology is expressed as “a study of the spatial and temporal relations of human beings as affected by the selective and accommodative forces of the environment” (Park, Burgess, Mckenzie, 1925 cited by Banga, 2011).

2.8 Conceptual Framework

This study is guided by the following conceptual framework.

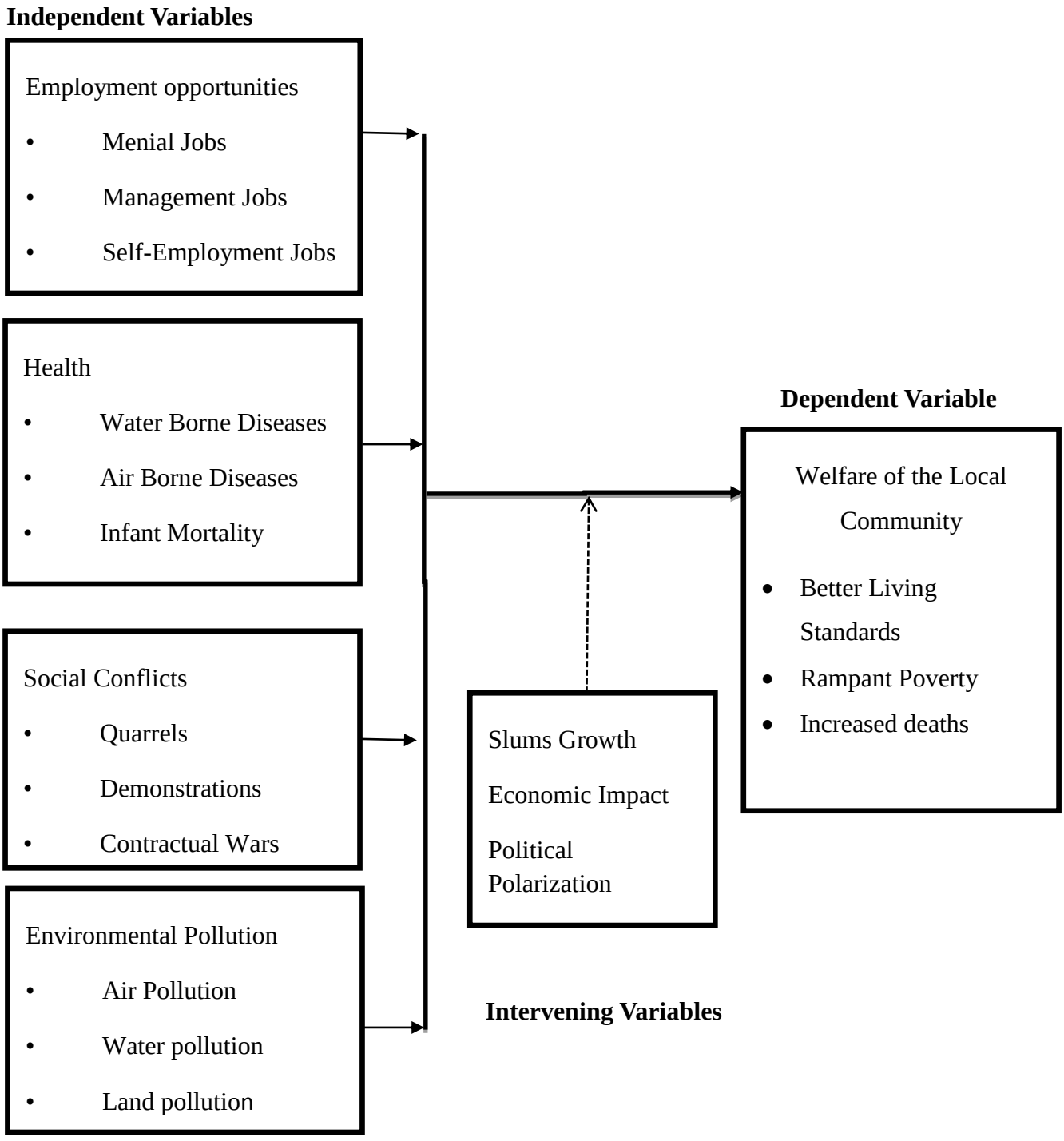

Figure 1: Conceptual Framework

As per the literature review, the conceptual framework has underlined a number of issues surrounding the SW management projects in relation to the welfare of the society. The dependent variable in this research is the effect of solid waste management projects on the welfare of the local community and has the indicators like, increased jobs, rise in health hazards, increased community conflicts, and increased environmental pollution. The dependent variables are on the left hand side and include employment opportunities, health issues, social conflicts and finally environmental pollution. The intervening variables have also been included in the table and include; slums growth, economic impact and political polarization.

2.9 Summary of Literature Review

The literature has started by giving the concept of SW management projects from the global, continental, regional and finally from the Kenyan perspective. The literature has given the theory to be used in the research principles of urban ecology theory. The literature has further focused of the reviewed work from various scholars in relation to the given objectives under sub-headings like employment, health issues, environmental pollution and finally the social conflicts. A conceptual framework has been attached to give a summary of all the work reviewed.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodology that was used to conduct the study, focusing on research design, target population, sampling procedures and sample size, research instruments, questionnaires, pilot study, reliability, validity, data collection procedure, methods of data analysis, ethical consideration and operationalization of the variables.

3.2. Research Design

Research design refers to the procedures selected by a researcher for studying a particular set of questions or hypothesis; this includes the researcher's choice of quantitative or qualitative methodology, and how, if at all, causal relationships between variables or phenomena are to be explored (Kothari, 1990). This study employed the use of a descriptive survey research design. Kothari (2004) describes a descriptive survey as a means of gathering information about the characteristics, actions or opinions of a large group of people. Surveys are capable of obtaining information from large samples of the population over a short period of time thus very suitable for this study since the scope is large. This design was also suitable as it will bring out information on attitudes that would be difficult to measure using observational techniques.

3.3 Target Population

According to Mugenda & Mugenda (2003), target population is a set of people or objects the researcher wants to generalize the results of the research. The study was carried out in Mombasa County which covers three major dumping sites at Kisauni's Mwakirunge, Nyali's VOK area and Changamwe Kibarani area. The target population was also the stake holders who were: The residents represented by the number of households directly affected by the SW projects operated next to their residential areas, the environmental Managers at the Mombasa County, The garbage wheel/trucks loaders and the contracted Garbage collection companies via the PPPs. A report published by the globalmethane.org in 2015 entitled 'solid waste situation in Mombasa city) indicates that here are on average 6420 parties (households, garbage collection companies and environmental managers) from the three regions as shown in Table 3.1.

Table 3.1 Target Population

Population Target	Total Number	Percentage
Changamwe	**2444**	**38.07%**
Nyali	**1466**	**22.83%**
Kisauni	**2510**	**39.10%**
Total	**6420**	**100%**

Source: http://globalmethane.org/documents/events_land_120910_9.pdf. (2015)

3.4 Sample Size and Sampling Procedure

According to Gary (2008), a sample size of a survey most typically refers to the number of units that were chosen from which data were gathered. However, sample size can be defined in various ways. There is the designated sample size, which is the number of sample units selected for contact or data collection. Sampling procedure refers to the process through which the researcher chooses a particular population representative from the larger study population.

3.4.1 Sample Size

Participants to the study included key informants whom the researcher believed would provide the needed data. The study sample size was calculated using Yamane formula (1967).In this formula, sample size can be calculated at 3%, 5%, 7% and 10% precision (e) levels. Confidence level that was used was 95% with degree of variability (p) equivalent to 50% (0.5).

$$n = \frac{N}{1 + N\,(e)^2}$$

n = Desired sample size when population is less than 10,000.

e= sampling error/precision level

N = Study Population

In this study sample size was at precision level of 10% (e=0.1). Therefore the desired sample size was:

$$n = \frac{6420}{1 + 6420(0.1)^2} = 98.46 \approx 99 \text{ sample respondents.}$$

3.4.2 Sampling Procedure

A total of 99 respondents were selected using systematic sampling procedure to participate in the study. In this sampling method, simple random sampling was applied to select the first respondent and the subsequent ones were selected as per the n^{th} term. In the proposed study the n^{th} term was 65 that is 6420/99=65, therefore the researcher used skip to select respondents based on the sample frame. This sampling was strictly done in the people who make the population of the study in the three regions of Kisauni, Nyali and Changamwe and who fell in the category of either households directly affected by the SW projects operated next to their residential areas, the Environmental Managers at the Mombasa County, the garbage wheel/trucks loaders and the contracted garbage collection companies' key employees under the PPPs. This is shown in the table 3.2.

Table 3.2 Sample Population

Location	Population(N)	Sample (N/6420)x99
Changamwe	**2444**	**37**
Nyali	**1466**	**23**
Kisauni	**2510**	**39**
Total	**6420**	**99**

3.5 Research Instruments

The questionnaire was the main instrument of data collection that was used. The questionnaire helped the researcher to collect data on knowledge, opinions as well as attitudes of respondents towards the effects of solid waste managements on the welfare of the local communities. The

questionnaire was suited for this study because it is practical and is used to collect data from a large number of people within a short time and in a relatively cost effective manner. The questionnaires was used to collect data from the households heads directly affected by the SW projects operated next to their residential areas, the environmental managers at the Mombasa County, the garbage wheel/trucks loaders and the contracted garbage collection companies via the PPPs. Observation was expected to be used to help gather crucial data that couldn't be obtained through questionnaires. The questionnaire was administered by the researcher and selected enumerators who at one point served as translators. Both open ended and closed ended questions were used. Open ended questions enabled respondents to provide sufficient details while close ended questions enabled the researcher to easily quantify results by the use of SPSS.

3.5.1 Validity and Reliability

A measure of how well a test measures what it is supposed to measure is referred to as validity. This is the degree to which results gotten really represent the occurrence under investigation. The measure of the degree to which a research instrument yields consistent results after repeated trials is reliability.

3.5.2 Validity of the Research Instrument

Kothari (2004) states that validity is the quality that a procedure or tool or instrument that is used in research has, accuracy, correctness, trueness and meaningfulness. Content validity was used in the research to measure the degree to which the questionnaire collected the represents the objectives of the study. The instrument was verified by the supervisor, other two senior lecturers in the University of Nairobi, and, two research experts from NGOs that deal with environmental issues touching on SW management in Mombasa County (NEMA & UNEP).

3.5.3 Reliability of the Research Instrument

Zikmund (2003) states that reliability is concerned with estimations of the degree to which a research instrument yields stable results after repeated trials. In this study, reliability was determined by a test-retest administered to 10 subjects not included in the sample. This was achieved in that, the first set of 10 questionnaires that were administered to 10 respondents, and later on the same repeated in two weeks. Input from invaluable sources was obtained during the

study that was useful in modifying the questionnaire before a final set of questions could be produced.

3.6 Data Collection Procedure

A questionnaire was used since it was the best tool for this study. The questionnaire was prepared on the basis of a review of literature on SW management projects in Kenya and the rest of the world. Data collection tools were piloted and suggestions made before finalizing the questionnaire. The study utilized a self-administered questionnaire and equally referred to the existing secondary data. The researcher got a permit from the graduate school and county minister of environment and natural resources. The researcher visited the sample, used enumerators to access some other people in far areas, and e-mailed a questionnaire to some respondent who could be committed for one on one filling. Appointments to the sampled groups of respondents, especially those in formal employment, were arranged prior to the visits to avoid any inconveniences to the respondents. The researcher emphasized that the information given was specifically to be used for the study and it would be private and confidential and that names couldn't be necessary.

3.7 Data Analysis Techniques

The questionnaires were received and sorted out to separate those fully filled and thus valid for the study from those that did not meet the researcher's expectations. Quantitative data obtained from the open ended questions was coded to facilitate quantitative analysis. The coded data was analyzed by use of descriptive statistics comprising of frequency tables. The hypothesis was tested by use of Chi Square. Data analysis was done by use of SPSS 20.0

3.8 Ethical Considerations

All government and county authorities were informed prior to the study to avoid suspicions and resistance from the community members. Consent was sought from the respondents whose participation in this study was voluntary. The information they provided was treated with utmost confidentiality. Privacy and dignity of the respondents was considered during the research. Names of the respondents were not exposed and codes were used instead.

3.11 Operationalization of the variables

Table 3.3 Operationalization Table

Objective	**Variable**	**Indicators**	**Measurement scale**	**Types of analysis**
To examine how employment opportunities created by waste management projects affects the welfare of the local communities of Mombasa County, Kenya	Employment opportunities	Menial Jobs Management Jobs Self-Employment Jobs	Ordinal Scale	Descriptive
To assess how health related problems created by waste management projects affects the welfare of the local communities of Mombasa County, Kenya.	Health	Water Borne Diseases Air Borne Diseases Infant Mortality	Ordinal Scale	Descriptive
To examine how environmental pollution created by waste management projects affects the welfare of the local communities of Mombasa County, Kenya.	Environmental Pollution	Air Pollution Water pollution Land pollution	Ordinal Scale	Descriptive
To determine how social conflicts created by waste management projects affects the welfare of the local communities of Mombasa County, Kenya.	Social Conflicts	Quarrels Demonstrations Contractual Wars	Ordinal Scale	Descriptive

CHAPTER FOUR

DATA PRESENTATION AND INTERPRETATION

4.1 Introduction

The data collected was sorted, keyed and analyzed by simple descriptive analysis using Statistical Package for Social Scientists (SPSS). The data was then presented through frequency tables and narrative analysis. The questions were tested of their significance by use of the mean weighed against each score in the Likert scale.

4.2 Return Rate of the Questionnaires

Out of the 99 questionnaires issued to the respondents, 90 were returned and were useful for the study. Therefore the return rate was 90.9% positive while negative response was 9.1%.

4.3 General Information

General basic information of the respondents was sought for and the summary given in the table below:

Table 4.1 Basic Information about the Respondents

Response	Frequency	Percentage	Total
Gender	F (30)	33.3 %	
	M (60)	66.7 %	90
Age Bracket	18-30 (9)	10%	
	31-40 (36)	40%	
	41-50 (27)	30%	
	51-60 (9)	10%	
	>61 (9)	10%	90
Academic qualifications	Primary (27)	30 %	
	Secondary (18)	20%	
	Diploma (27)	30%	
	Bachelor's degree (18)	20 %	
	Other (specify) (0)	00%	90
Respondents position	Project Manager (36)	40%	
	Employee (27)	30%	
	Affected resident (9)	10%	
	Loader (9)	10%	
	County government worker (9)	10%	90
Average total		**100%**	**90**

From the responses gotten in the field, 33.3 % of the respondents represented women who were 30 while the remaining 60 who represented 66.7% were men. This is in line with the fact that

men are the most employees in the waste management points in the county just like it is elsewhere in the world.

In relation to age bracket of the respondents, from the table ages between 18-30 years had 9 who made 10% of the total respondents, 31-40 years attracted 36 respondents who made 40%, 41-50 years had 27 respondents who made 30%, 51-60 years attracted 10% while the remaining 9 with 10% were over 60 years.

Responses on academic qualifications were as follows: Primary certificate attracted 27 respondents who represented 30%, 18 attracted secondary certificate with a percentage of 20%, diploma attracted 27 respondents who made 30%, bachelors attracted 18 respondents who made 20%, and postgraduate degree attracted 0 respondents.

Finally, responses on academic qualifications showed that, 36 of the respondents were project manager who made 40%, respondents who were employees were 27 who made 30%, affected resident were 9 who made 10%, loaders were 9 who made 10%, while, county government workers were 9 who made 10% .

4.4 Responses in Relation to Employment Opportunities

The research sought to explore from the respondents whether the solid waste management projects in Mombasa County had an impact in employment patterns in the region and a number of responses were as follows:

Table.4.2 Response on Employment Opportunities

Respondents were asked with relevant examples supporting their answers whether they thought that solid waste management projects in Mombasa County have led to jobs creation and responses were as follows:

Response	Frequency	Percentage
No	9	10%
Yes	72	80%
Not sure	9	10%
Total	**90**	**100%**

From the field information, 10% of the respondents argued that the solid waste management projects in Mombasa County have never created any visible job to the locals as this is attributed to the fact that people in the projects could be companies from elsewhere that employs people who are not affiliated to local settings. In relation to the yes response, 80% of the respondents felt that the projects associated with solid waste management projects in Mombasa County have helped in creating a number of jobs more specifically to the youths who work in waste collection points, recycling and disposal. Those who were not sure with the question had a representation of 10%.

Examples given to support the answers included: workers in the spots where waste is collected, county lorry drivers and loaders, the waste boards' managers and many more.

Table 4.3 Degree of Rating of Jobs Creation

On a scale of rating, respondents were asked to indicate the extent to which they agreed or disagreed with the following statements. (Scale of 1-5 where **1= strongly disagree; 2 = disagree; 3 =neutral; 4 =agree; 5 = strongly agree).**

Statement	**1**	**2**	**3**	**4**	**5**
SW management projects have led to Menial Jobs creation at all phases.	7	9	4	40	30
SW management projects have led to Management Jobs creation all phases.	5	9	10	38	28
SW management projects have led to Self-Employment Jobs creation all phases.	2	5	15	30	38

From the responses, in relation to the first statement that read, SW management projects have led to Menial Jobs creation at all phases, responses were as follows: 7 respondents strongly disagreed with the statement, 9 disagreed, 4 were neutral, 40 agreed, while the remaining 30 strongly agreed with the idea that menial jobs have been created. When a mean was calculated in regard to the statement, a mean value of 3.85 was found that corresponded to agree.

In relation to the second statement that that read, SW management projects have led to Management Jobs creation all phases, there were 5 of the respondents who strongly disagreed, 9 respondents disagreed, neutral were 10, those in agreement were 38, while 28 strongly agreed who formed the remaining proportion. When an average was calculated in relation to the statement, a mean value of 3.83 was arrived at which corresponded to agree.

Finally, the statement that said, SW management projects have led to self-employment jobs creation all phases attracted different responses whereby, 2 respondents strongly disagreed, 5

disagreed, 15 were neutral, 30 agreed, while the remaining 38 strongly agreed. When a mean was calculated, a value of 4.07 was arrived at that was equivalent to agree response.

Table 4.4 Mean and Standard Deviation Scores for Job Creation

On average, the researcher calculated the mean scores and the standard deviation to show the relationship between the variables as shown below:

Statement	Mean	Std. Dev.
SW management projects have led to Menial Jobs creation at all phases.	3.87	1.12
SW management projects have led to Management Jobs creation all phases.	3.8	1.16
SW management projects have led to Self-Employment Jobs creation all phases.	4.41	0.589

On average, over 78% of the respondents agreed with the idea that there are jobs that have been created by the solid waste management projects in Mombasa County. Self-employment job had the strongest score with a mean of 4.41 that missed only 0.09 to score a strongly agree statement.

4.5 Health Issues Associated With Solid Waste Management Projects in Mombasa County

Respondents were asked to indicate whether there are health issues that have been associated or influence by the Solid Waste Management Projects in Mombasa County and a number of responses were given as indicated in the tables below:

Table 4.5 Responses on Health Issues Associated with Solid Waste Management Projects

Respondents were asked whether they thought that there are health issues that have affected the people and animals due to the implementation the Waste Management Projects in Mombasa County and the responses in the table below were arrived at:

Response	Frequency	Percentage
No	18	20%
Yes	72	80%
Total	**90**	**100%**

From the responses, 80% of the respondents supported the idea that there is a number of health issues associated with the implementation of the Waste Management Projects in Mombasa County while the no response attracted 20%. The health issues in all cases cut across the animals and the people in the region.

When giving relevant examples, those 80% of the respondents who went for the yes answer gave examples like respiratory diseases that have been diagnosed in the individuals surrounding the area, outbreak of diseases like cholera and other water borne diseases, sudden deaths of abnormal people and drunkards who have for a long time fallen in the dumpsites for example and many more. Those who went for no gave examples of the projects being an opportunity for a living.

Table 4.6 Rating of Health Issues on a Scale

Respondents were asked the extent to which they agreed or disagreed with the following statements in relation to health and Solid Waste Management Projects using a scale of 1-5 where 1= strongly disagree; 2 = Disagree; 3 =neutral; 4 =Agree; 5 = strongly agree and results as below arrived at.

Statement	1	2	3	4	5
Solid waste management projects have led to Water Borne Diseases.	6	7	9	28	40
Solid waste management projects have led to Air Borne Diseases.	8	9	9	35	28
Solid waste management projects have led to Infant Mortality.	7	9	12	30	32

From the responses gotten in the field, 6 respondents strongly disagreed with the idea that Solid waste management projects have led to water borne diseases in the area, 7 disagreed, 9 were neutral, 28 agreed and the rest who were 40 strongly agreed. On average, a value of 3.98 was calculated that correspondent to agree response.

In relation to the second statement that that read, solid waste management projects have led to air borne diseases in the area, 8 of the respondents strongly disagreed, 9 of the respondents disagreed, there were 9 who were neutral, 35 agreed, while 28 of those remaining strongly agreed with the statement. On average, a value of 3.63 was calculated that correspondent to 3.63 response.

Finally, the idea that Solid waste management projects have led to Infant Mortality attracted 7 respondents who strongly disagreed, 9 who disagreed, 12 were neutral, 30 who agreed, while the remaining 32 strongly agreed. On average, a value of 3.79 was calculated that correspondent to agree response.

Table 4.7 Mean Scores for Issues associated with SWM projects

The researcher weighed the responses on the issues surround health and solid waste management projects and the scores were as follows:

Statement	Mean	Std Dev.
Solid waste management projects have led to Water Borne Diseases.	3.988	1.001
Solid waste management projects have led to Air Borne Diseases.	3.7	1.03
Solid waste management projects have led to Infant Mortality.	3.788	1.21

On average, over 76% of the respondents agreed with the idea that SWM projects have led to health issues that include water borne diseases, air borne diseases and infant mortality rates.

4.6 Social Conflicts Associated with Solid Waste Management Projects Implementation

Respondents were asked a number of questions in relation to social conflicts associated with solid waste management projects implementation in Mombasa County and the results in the tables below were arrived at.

Table 4.8 Responses on the Issues of Social Conflicts

Respondents were asked whether they thought that the implementation of the solid waste management projects is associated with any conflicts in the society and this be attached to relevant examples if any. The table below shows the responses:

Response	Frequency	Percentage
No	7	7.8%
Yes	72	80%
Not sure	11	12.2%
Total	**90**	**100%**

From the responses, 7.8% of the respondents who were made of 7 respondents said that there have not been any social conflicts associated with the implementation of the solid waste management projects in Mombasa County, 72 who represented 80% said that there have been conflicts that are associated with the implementation of the solid waste management projects and finally 12.2% of the respondents were not sure.

When asked to support their answers with relevant examples, on average, over 80% of the respondents gave issues like increased social unrests, quarrels, strife and sometimes violent wars that have been witnessed between various groups collecting the garbage or regular wars from organized gangs that want to control the dumpsites due to the recyclable valuables. Also, wars have been experienced on ways in which contracts and tenders of garbage collection are allocated to various companies in the county.

Table 4.9 Rating of Social conflicts on a Likert scale

Respondents were asked to indicate how they agreed or disagreed with the following statements in relation to social conflicts associated with the implementation of the solid waste management projects; where 1= strongly disagree; 2 = disagree; 3 =not sure; 4 =agree; 5 = strongly agree.

Statement	**1**	**2**	**3**	**4**	**5**
Solid waste management projects have accelerated Quarrels in Mombasa County	8	9	4	34	35
Solid waste management projects have accelerated Demonstrations in Mombasa county	7	8	8	45	22
Solid waste management projects have led to Contractual Wars.	12	10	9	29	30

From the responses given in the field, 8 respondents strongly disagreed with the idea that, Solid waste management projects have accelerated Quarrels in Mombasa County, 9 disagreed, 4 were neutral, 45 agreed while the remaining 22 strongly agreed. On average, a value of 3.88 was calculated that correspondent to agree response.

In relation to the second statement that read, Solid waste management projects have accelerated Demonstrations in Mombasa County, had 7 respondents who strongly disagreed, 8 disagreed, 8 were neutral, 45 agreed, while the remaining 22 strongly agreed. On average, a value of 3.74 was calculated that correspondent to agree response.

Finally, the statement that said, Solid waste management projects have led to Contractual Wars attracted different responses whereby, 12 respondents strongly disagreed, 10 disagreed, 9 were not sure, 29 agreed, while the remaining 30 strongly agreed. On average, a value of 3.61 was calculated that correspondent to agree response.

4.10 Mean Scores for Social Conflicts

Statement	Mean	Std. Dev.
Solid waste management projects have accelerated Quarrels in Mombasa County	3.877	1.122
Solid waste management projects have accelerated Demonstrations in Mombasa county	3.7	1.252
Solid waste management projects have led to Contractual Wars.	3.61	1.038

On average, over 73% of the respondents supported the idea that SWM projects have led to social conflicts that include quarrels, demonstrations, and at times wars.

4.7 Responses on Items on Environmental Pollution

Respondents were asked to give their views in relation to Environmental Pollution and results in the tables below were given:

Table 4.11 Responses on Environmental Pollution

Respondents were asked to give their yes or no answer in relation to the question that Solid waste management projects in Mombasa County have led to environmental pollution and with were coupled with relevant examples. The responses in the table below were arrived at:

Response	Frequency	Percentage
No	18	20%
Yes	54	60%
Not sure	18	20%
Total	**90**	**100%**

From the responses, 54 respondents argued that the Solid waste management projects in Mombasa County have led to environmental pollution in the area, 20% of the respondents went for no and not sure in the same proportions. When asked to support their reasons, on average, 60% of the respondents gave reasons like air pollution due to dumping has been experienced, soil/land pollution due to non-biodegradable materials disposal, water pollution in areas around Changamwe dumping site where the waste is directed into water and many more.

Table 4.12 Rating of Responses on Environmental Pollution

Respondents were asked to rate the extent to which they agreed or disagreed with the following statements. Scale of use: 1-5, where, **1= strongly disagree; 2 = disagree; 3 =neutral; 4 =agree; 5 = strongly agree.**

Statement	**1**	**2**	**3**	**4**	**5**
Air Pollution has been an issue due to solid waste management projects.	8	9	12	34	27
Water pollution has been on the rise due to solid waste management projects	8	8	16	30	28
Land pollution is a key issue in SW management projects.	9	9	15	29	28

From the responses, in relation to the first statement that said, Air Pollution has been an issue due to solid waste management projects, 8 respondents strongly disagreed, 9 disagreed, 12 were neutral, 34 agreed, while the remaining 27 strongly agreed. On average, a value of 3.7 was calculated that correspondent to agree response. In relation to the statement that read, Water pollution has been on the rise due to solid waste management projects in the area attracted 8 respondents who strongly disagreed, 8 disagreed, 16 were not sure, 30 agreed, while the remaining 28 strongly agreed. On average, a value of 3.69 was calculated that correspondent to agree response. In relation to the final statement that focused on land pollution is a key issue in SW management projects, those that strongly disagreed were 9, those that disagreed were 9,

those who were neutral were 15, 29 did agree, while the remaining 28 strongly agreed. On average, a value of 3.64 was calculated that correspondent to agree response.

Table 4.13 Mean Scores on Pollution and SWM Projects

Statement	Mean	Std dev.
Air Pollution has been an issue due to solid waste management projects.	3.7	**1.03**
Water pollution has been on the rise due to solid waste management projects	4.022	**0.9**
Land pollution is a key issue in SW management projects.	3.64	**1.035**

On average, over 75.74% of the respondents agreed that there is a relationship between environmental pollution and the implementation of SWM projects in Mombasa County.

4.8 Hypothesis Testing

The research sought to establish the relationship between the independent variables and the dependent by conducting the Chi-Square tests.

Table 4.14 Testing of the First Hypothesis

H_1: Employment opportunities created by waste management projects have a significant effect on the welfare of the local communities of Mombasa County, Kenya.

f	e	(f-e)=d	$(d)^2$	$(d)^2/f$
7	18	-11	121	6.7
9	18	-9	81	4.5
4	18	-14	196	10.8
40	18	22	484	26.8
30	18	12	144	8
				$\sum (d)^2/f = 56.8$

$\chi^2_C = 56.8 > \chi^2_{\alpha\ 0.05}$ = 9.488 at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 56.8 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis. Thus, employment opportunities created by waste management projects have a significant effect on the welfare of the local communities of Mombasa County, Kenya.

Table 4.15 Testing of the Second Hypothesis

Health related problems created by waste management projects have a significant effect on the welfare of the local communities of Mombasa County, Kenya.

f	e	(f-e)=d	$(d)^2$	$(d)^2/f$
6	18	-12	144	8
7	18	-11	121	6.7
9	18	-9	81	4.5
28	18	10	100	5.5
40	18	22	484	26.8
				$\sum (d)^2/f = 51.5$

$\chi^2_C = 51.5 > \chi^2_{\alpha\ 0.05}$ = 9.488 at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 51.5 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis. Thus, Health related problems created by waste management projects have a significant effect on the welfare of the local communities of Mombasa County, Kenya.

Table 4.16 Testing of the Third Hypothesis

Social conflicts created by waste management projects have significant effect on the welfare of the local communities of Mombasa County, Kenya.

f	e	(f-e)=d	$(d)^2$	$(d)^2/f$
8	18	-10	100	5.5
7	18	-11	121	6.7
4	18	-14	196	9.4
34	18	14	196	10.8

35	18	17	289	16.1
				$\sum (d)^2/f = 48.5$

$\chi^2_C = 48.5 > \chi^2_{\alpha\ 0.05}$ = 9.488 at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 48.5 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis. Thus, Social conflicts created by waste management projects have significant effect on the welfare of the local communities of Mombasa County, Kenya.

Table 4.17 Testing of the Fourth Hypothesis

Environmental pollution created by waste management projects has a significant effect on the welfare of the local communities of Mombasa County, Kenya.

f	**e**	**(f-e)=d**	**$(d)^2$**	**$(d)^2/f$**
9	18	-9	81	4.5
9	18	-9	81	4.5
15	18	-3	9	0.5
29	18	11	121	6.7
28	18	10	100	5.5
				$\sum (d)^2/f = 21.7$

$\chi^2_C = 21.7 > \chi^2_{\alpha\ 0.05}$ = 9.488 at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 21.7 is greater than the critical chi-square value at 5%

level of confidence, we accept the alternative hypothesis. Thus, Environmental pollution created by waste management projects has a significant effect on the welfare of the local communities of Mombasa County, Kenya.

CHAPTER FIVE

SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study findings, discussions, conclusions and recommendation of the research. The chapter also contains suggestions of related studies that may be carried out in the future.

5.2 Summary of Findings

Questionnaires were the main data collection tools that were used and they were allocated to a population sample of 99 respondents of whom 90 returned well filled questionnaires that were valid for the study. Findings from the field show that, in relation to the first objective that sought to examine how employment opportunities created by waste management projects affects the welfare of the local communities of Mombasa County, 80% of the respondents supported the argument, 10% said no while the remaining 10 were not sure. Examples given to support the answers included: workers in the spots where waste is collected, county lorry drivers and loaders, the waste boards' managers and many more. On a rating scale, in relation to the first statement that read, SW management projects have led to Menial Jobs creation at all phases, responses were as follows: 7 respondents strongly disagreed with the statement, 9 disagreed, 4 were neutral, 40 agreed, while the remaining 30 strongly agreed with the idea that menial jobs have been created. This was the case in the second statement that read, SW management projects have led to Management Jobs creation all phases whereby there were 5 of the respondents who strongly disagreed, 9 respondents disagreed, neutral were 10, those in agreement were 38, while 28 strongly agreed who formed the remaining proportion. When averages were calculated, all the statements accepted values that were agreeing i.e 3.85, 3.83 and 4.07 respectively.

In relation to the second objective which sought to assess how health related problems created by waste management projects affects the welfare of the local communities of Mombasa County, 80% of the respondents supported the idea that there is a number of health issues associated with the implementation of the Waste Management Projects in Mombasa County while the no

response attracted 20%. The health issues in all cases cut across the animals and the people in the region. When giving relevant examples, 80% of the respondents who went for the yes answer gave examples like respiratory diseases that have been diagnosed in the individuals surrounding the area, outbreak of diseases like cholera and other water borne diseases and many more. On a rating scale of statements, 6 respondents strongly disagreed with the idea that Solid waste management projects have led to water borne diseases in the area, 7 disagreed, 9 were neutral, 28 agreed and the rest who were 40 strongly agreed. On average, a value of 3.98 was calculated that correspondent to agree response. In relation to the second statement that that read, solid waste management projects have led to air borne diseases in the area, those who strongly disagreed were 8, 9 of the respondents disagreed, the neutral respondents were 9, and those who agree were 35, while the remaining 28 strongly agreed with the statement. On average, a value of 3.63 was calculated that correspondent to 3.63 response. The results were also similar with the idea that associated infants' mortality rates to SWM projects.

As per the third objective that sought to determine how social conflicts created by waste management projects affects the welfare of the local communities of Mombasa County, 7.8% of the respondents who were made of 7 respondents said that there have not been any social conflicts associated with the implementation of the solid waste management projects in Mombasa County, 72 who represented 80% said that there have been conflicts that are associated with the implementation of the solid waste management projects and finally 12.2% of the respondents were not sure. On average, over 80% of the respondents gave issues like increased social unrests, quarrels, strife and sometimes violent wars that have been witnessed between various groups collecting the garbage or regular wars from organized gangs that want to control the dumpsites due to the recyclable valuables. Also, wars have been experienced on ways in which contracts and tenders of garbage collection are allocated to various companies in the county. On a rating scale, the statement that said, Solid waste management projects have led to Contractual Wars attracted different responses whereby, 12 respondents strongly disagreed, 10 disagreed, 9 were not sure, 29 agreed, while the remaining 30 strongly agreed, as it was in the case with other statements. On average, a value of over 3.61 was calculated that correspondent to agree response.

In relation to the final objective that sought to examine how environmental pollution created by waste management projects affects the welfare of the local communities of Mombasa County, 54 respondents argued that the Solid waste management projects in Mombasa County have led to environmental pollution in the area, 20% of the respondents went for no and not sure in the same proportions. When asked to support their reasons, on average, 60% of the respondents gave reasons like air pollution due to dumping has been experienced, soil/land pollution due to non-biodegradable materials disposal, water pollution in areas around Changamwe dumping site where the waste is directed into water and many more. On a rating scale, from the responses, in relation to the first statement that said, Air Pollution has been an issue due to solid waste management projects, 8 respondents strongly disagreed, 9 disagreed, 12 were neutral, 34 agreed, while the remaining 27 strongly agreed. On average, a value of 3.7 was calculated that correspondent to agree response. Equally, in relation to the statement that read, Water pollution has been on the rise due to solid waste management projects in the area attracted 8 respondents who strongly disagreed, 8 disagreed, 16 were not sure, 30 agreed, while the remaining 28 strongly agreed. On average, a value of 3.69 was calculated that correspondent to agree response. This was the same with the response land pollution.

5.3 Discussion of Findings

Results from the above have shown that a number of responses and views from the field are tied with the finding in the review of the secondary information in chapter two. For example, in relation to the first objective that in relation to the first objective that sought to examine how employment opportunities created by waste management projects affects the welfare of the local communities of Mombasa County, 80% of the respondents supported the argument, 10% said no while the remaining 10 were not sure. Examples given to support the answers included: workers in the spots where waste is collected, county lorry drivers and loaders, the waste boards' managers and many more. This is shown by a number of scholars in the literature review. For example, in Asian countries, Sakai *et al* (2011) observe that MSW in countries like India the recycling of resources is mostly done by the informal sector as a means of employment.

This is well articulated by Nyaga (2014) who notes that in Mombasa just as the situation is in other parts of the country, a number of projects have been initiated by the county government that has distributed waste handling trucks at various points where individuals are to empty their

waste into. He further argues that in cases where the trucks are far from the residents, the MCAs have partnered with village administrators and distributed Carts (mikokoteni) that are under a group of 10 jobless youth per cart so that they can earn a living from it. This actually is true with the findings that had a mean score of above average in which respondents agreed to the point that SWMP in the county have led to both menial, technical and self-employment opportunities for both the locals and other residents.

In relation to the second objective which sought to assess how health related problems created by waste management projects affects the welfare of the local communities of Mombasa County, 80% of the respondents supported the idea that there is a number of health issues associated with the implementation of the Waste Management Projects in Mombasa County while the no response attracted 20%. The health issues in all cases cut across the animals and the people in the region. According to World Bank (2012), Landfill sites due to SW management projects initiated by various governments in both the developed countries and the under developed countries have brought about Birth defects and reproductive disorders. Reproductive effects associated with landfill sites have been extensively researched and include low birth weight (less than 2500 g), fetal and infant mortality, spontaneous abortion, and the occurrence of birth defects.

When giving relevant examples from the responses, results showed that, 80% of the respondents who went for the yes answer gave examples like respiratory diseases that have been diagnosed in the individuals surrounding the area, outbreak of diseases like cholera and other water borne diseases and many more. This is supported by Ng'era (2014) who argues that many of the studies investigating health outcomes other than birth defects and reproductive orders and cancers have been community health surveys and have relied on the self-reporting of symptoms through interviews or questionnaires in Mombasa in relation to health issues to the communities as a result of SW management programs. The health problems investigated include respiratory symptoms, irritation of the skin, nose and eyes, gastrointestinal problems, fatigue, headaches, psychological problems and allergies. It has been suggested that evaluation of a relationship between these symptoms is complicated by confounding by stress, public perception of risk, odours and nuisance related to the site, and recall bias, but on overall, SWMP have led to a number of respiratory related complications in areas like VOK, Likoni, Changamwe and many more.

As per the third objective that sought to determine how social conflicts created by waste management projects affects the welfare of the local communities of Mombasa County, 7.8% of the respondents who were made of 7 respondents said that there have not been any social conflicts associated with the implementation of the solid waste management projects in Mombasa County, while 72 who represented 80% said that there have been conflicts that are associated with the implementation of the solid waste management projects. On average, over 80% of the respondents gave issues like increased social unrests, quarrels, strife and sometimes violent wars that have been witnessed between various groups collecting the garbage or regular wars from organized gangs that want to control the dumpsites due to the recyclable valuables. Also, wars have been experienced on ways in which contracts and tenders of garbage collection are allocated to various companies in the county. This has been affirmed to by a number of scholars from the literature review.

For example, according to UNEP (2013) a number of issues like contractual wars and the assigning of contracts have existed for long now in Kenya in relation to SW management. This has left a number of contracts landing into private firms that have little manpower and resources to manage the SW projects due to corrupt deals and nepotistic contract signings. This has been reported in Town like Thika where the contractors themselves incite their employees to rise against each other-2011, in Kisumu and Mombasa whereby various west pickers who felt that they initially owned the zones of west collection and many more. Also, Nyokabi (2011) argues that, in Mombasa just like it has been happening in Nairobi's dumpsite of Dandora, frequently, there have been reports of enmity, hatred, wars and at times demonstrations from various groups of waste pickers from the various waste management sites in the towns. In Dandora for example, wars have been experienced between the various north and south gangs, once one gang collected recyclable waste beyond the boundaries put. This has often led to gang wars between the groups; incidences that at times involve gun fights. In Mombasa though minimal, a number of wars have been reported due to disagreements between the waste pickers in the county.

In relation to the final objective that sought to examine how environmental pollution created by waste management projects affects the welfare of the local communities of Mombasa County, 54 respondents argued that the Solid waste management projects in Mombasa County have led to

environmental pollution in the area, 20% of the respondents went for no and not sure in the same proportions. When asked to support their reasons, on average, 60% of the respondents gave reasons like air pollution due to dumping has been experienced, soil/land pollution due to non-biodegradable materials disposal, water pollution in areas around Changamwe dumping site where the waste is directed into water and many more. Concurring to this is Zhuang, Wang, Wu & Chen (2010) who argue that one major environmental issue associated with the private and municipal SW management projects in China today is the issue of surface water contamination. According to them, in the eastern parts of the country for example, Waste that ends up in water bodies negatively change the chemical composition of the water. Technically, this is called water pollution. This will affect all ecosystems existing in the water. It can also cause harm to animals and families that drink from such polluted water.

Also, Lilia & Casanova (2010) in their work 'Assessing the Range of Options for PPP in Expanding Waste Management Services in Developing Countries' have touched on an issue caused by the various projects managing the SW and how they have led to Soil contamination in countries like Ethiopia, Philippines, Kenya, Angola and Nigeria. According to them, hazardous chemicals that get into the soil (contaminants) can harm plants when they take up the contamination through their roots. If humans eat plants and animals that have been in contact with such polluted soils, there can be negative impact on their health.

5.4 Conclusions

From a series of issues that have come into bow starting from the literature review, the information gathered in the field and the summary of the findings, the research concluded that the SW projects in Mombasa County just like any other in the rest of the world have led to jobs creation in the area and other surrounding environs.

The researcher also concludes that health hazards and issues have been surrounding the implementation of the SW projects in the area just like any SW projects across the world in countries like China, India, Uganda, and many more.

Also, the researcher concludes that social conflicts, wars, misunderstandings and societal clashes have been linked to SW projects implementation in the Mombasa County.

Finally, the researcher concludes that environmental pollution, soil degradation, ground water contamination among others has been associated to the implementation of waste projects in the Mombasa County. This has gone beyond to include the ugly looks of the lands enclosed in the dumpsite areas that have made it difficult for tourists for example to visit.

5.5 Recommendations

Based on the findings of the study the researcher makes the following recommendations:

First, the researcher recommends that the SW projects in the county should be formally organized from the low levels/village levels to the wider county levels since the projects have been proving more than self-employment.

Secondly, the researcher recommend that health hazards associated with SW management projects need to be controlled (through recycling and wastes toxics check) since the waste doesn't only lead to diseases cause but has led to a number of deaths and strained families health care.

Thirdly, the researcher recommends that social conflicts associated with such projects in the county and country at large must be addressed through various avenues like mutual designed committees, reconciliation bodies and penalties should be attached to those who break the set rules.

Finally, the researcher recommends that bodies like NEMA should be contacted in doing an up to date EIA so as to come up with better strategies of handling and disposing the waste with minimal pollution to the environs if any.

5.6 Suggestions for Further Research

i. The researcher suggest for a research to be done on determinants of community participation in SW management projects implementation in Mombasa County.
ii. Another study can also be done to investigate the sustainability of the ongoing reforms in the SW management in Mombasa County under the county governance.

REFERENCES

Afroz, R. & Masud, M. (2011). Using a contingent valuation approach for improved solid waste management facility: Evidence from Kuala Lumpur, Malaysia. Waste Management 31, 800-808.

Amfo-otu, R, Waife, E, D, Kwakwa, P, A, &Akpah, S,,(2012).Willingness to pay for solid waste collection in semi-rural Ghana.Alogit Estimation.International Journal of Multidisciplinary Research Vol.2 issue 7, July 2012, ISSN 2231 5780.

Arnold, V. D. K. &Lardinois, I. (2010). Community and Private (formal and informal) Sector Involvement in Municipal Solid Waste Management in Developing Countries WASTE Consultants, Advisers on Urban Environment and Development, Nieuwehaven 201, 2801 CW Gouda, the Netherlands.

Babalola, A., Ishaku, H.T., Busu I &Majid, M. R. (2010). The Practice and Challenges of Solid Waste Management in Damaturu, Yobe State, Nigeria; Tennesse, USA, and, Soweto, USA. Journal of Environmental Protection, 1, 384-388.

Banga, M. (2011). Household Knowledge, Attitudes and Practices in Solid Waste Segregation and Recycling: The Case of Urban Kampala. Zambia Social Science Journal, 2(1), 27-39.

Coffey, M. & Coad A. (2010). Collection of municipal solid waste in developing countries, Ed: 2nd. UN-Habitat, Nairobi

County report. (2014).http://www.lafarge.co.ke/Bamburi_Cement_Limited_and _Mombasa_County_sign_partnership_on_Solid_Waste_Management.pdf

Department of Water Affairs &Forestry. (2011). RSA. Waste Management Series.Minimum Requirements for Waste Disposal by Landfill.

Davidson, G. (2011). "Waste Management Practices". Retrieved from http://www.dal.ca/content/dam/dalhousie/pdf/sustainability/Waste%20Management%20Literature%20Review%20Final%20June%202011%20(1.49%20MB).pdf

Elias Mazhindu1, Trynos Gumbo and Tendayi Gondo. (2013).Waste Management Threats to Human Health and Urban Aquatic Habitats – A Case Study of Addis Ababa, Ethiopia. Ethiopian Civil Service University, Addis Ababa,, Ethiopia.

Environmental News Service.(2014). Giant waste poisoning Nairobi children, environment. Environmental News Service. Available at: www.ens-newswire.com/ens/oct2007/200710-09-01.html (accessed on 12 March, 2014).

Eurostat.(2010). End-of-life vehicles (ELVs), Reuse and Recovery rate, Last updated on16.04.2010, http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/data/wastestreams/elvs

GoI. (2013). Co-benefits of Waste Management: A Case of Surat, India .School of Planning and Architecture, Bhopal, India.

GoK, (2010a). Public Health Act (Cap 242). Government Printer Nairobi

GoK, (2011b).Environmental Management and Coordination Act (EMCA) No. 8 of 1999, Government Press, Nairobi.

GoK,(2011b).Environmental Management and Coordination (waste Management) Regulations, 2006, Legal Notice No. 121. 2-10. Government Printers, Nairobi

GoK.(2012a).Environmental Management and Co-ordination (Waste management Regulations, 2006). Government Printers, Nairobi

GoK.(2013).Ministry of State for Planning, National Development and Vision 2030. Government Printers, Nairobi

GoK.(2012b).National Environment Management Authority (NEMA) Records 2012. (Unpublished).

Gary M. Shapiro (2008). Encyclopedia of Survey Research Methods. http://srmo.sagepub.com/view/encyclopedia.

GPRB (2010). National 3R Strategy for Waste Management. Ministry of Environment and Forests. Department of Environment. Government Press.

Bangladesh Habitat International. (2010). Appraisal of solid waste collection following private sector involvement in Dar Es Salaam city, Tanzania.

http://globalmethane.org/documents/events_land_120910_9.pdf. (2015)

Judy Nyokabi. (2011). Solid Waste management in Kenya – the role of waste reclaimers.Judynyokabi.wordpress.com/2011/soild-waste-management-in-Kenya.

Kim P. (2014). Community-Based Waste Management for Environmental Management and Income Generation in Low-Income Areas: A Case Study of Nairobi, Kenya. City Farmer, Canada

Kothari, C.R. (1990). Research Methodology: Methods and Techniques. New Delhi: New Age International publishers limited.

Kothari, C. (2004). Research Methodology, (2nd ed). New Delhi: New age International Publishers.

Kuria, D, & Dr. Mireri, C. (2010).Policy and Ligislative Review Context for Reclaiming Waste in Kenya.Commisioned by Women in Informal Employment Globalizing and Organizing (WIEGO).

Kasima E.(2014).Efficiency Of Municipal Waste Water Treatment Plants In Kenya: A Case Study Of Mombasa Kipevu Treatment Works. Master Of Science In Chemistry Of The University Of Nairobi (Unpublished).

Leedy, P.D. &Ormrod, J. E. (2010). Practical Research: Planning and Design, Ninth Edition. NYC: Merrill.

Lesley Rushton.(2011). Health hazards and waste management.Oxford journals. http://bmb.oxfordjournals.org/content/68/1/183.full

Lilia, G.C. Casanova, (2010), Assessing the Range of Options for PPP in Expanding Waste Management Services in Developing Countries. Center for Advanced Philippine Studies, the Philippines and Anne Scheinberg, WASTE, The Netherlands

Maloba, Nelson Isaac. (2012). Factors influencing effective solid waste management: The case of Municipal Council of Mombasa, Kenya. UON. Research Thesis for MA.PPM

MDG Report. (2013). Assessing Progress in Africa toward the Millenium Development Goals. Food security in Africa: Issues, challenges and lessons. United Nations Economic Commission for Africa

Ministry of Devolution and Planning. (2014). Kenya National Bureau of Statistics 2009 population census

Ministry of Environment. (2010). Republic of Korea, Annual Report of Volume Based Waste Fee.

Modak, P. (2010), Community-based Waste Management and Composting for Climate/Co-benefits – Case of Bangladesh (2d) presented at the International Consultative Meeting on expanding Waste Management Services in Developing Countries, 18-19 March 2010, Tokyo, Japan, http://www.un.org/esa/dsd/susdevtopics/sdt_pdfs/meetings2010/icm0310/1b_Pras a d_Modak.pdf 9.

Monyoncho G.O. (2013). Solid Waste Management in Urban Areas of Kenya: A case study of Lamu Town. Department of Real Estate and Construction Management. University of Nairobi

Municipal Council of Mombasa.(2008; 2010). http://digitalcollections.sit.edu/cgi/viewcontent.cgi?article=2408&context=isp_collection

Municipal Council of Mombasa. (2014). http://digitalcollections.sit.edu/cgi/view content.cgi?article=2408&context=isp_collection

Mugenda, O. M. & Mugenda, A.G. (2003). Research Methods: Quantitative & Qualitative Approaches. Nairobi: Acts Press.

Mutai, P. &Njoroge, R. (2012). SWM a growing challenge in Kenya: Africa NewsKenya Focus, Nairobi: at http://www.coastweek.com/3535_solid.htm. Last accessed 4th October, 2013.

Mutuku M. (2013).Factors Influencing Household Solid Waste Disposal and Management In Garissa Town, Garissa County, Kenya. School Of Built Environment, University Of Nairobi.

Napoleon, S., Momodu, K., O. D., & Joan E. D. (2011).Mitigating the Impact of Solid Wastes in Urban Centres in Nigeria.Kamla-Raj.

National Waste & Recycling Association.(2013). "History of Solid Waste Management". Washington, DC. Retrieved 2013-12-09.

NCC- UNEP, (2010). Integrated Solid Waste Management Plan for the City of Nairobi, Kenya:

Situation Analysis & Detailed Action Plan (City Council of Nairobi - United Nation Environment Programme: 2010).

NEMA. (2013). A comparative study on the State of the Environment Report for Kenya and India, 2013. National Environment Management Authority, Nairobi.

Ng'eraKinyanjui.(2014). Challenges And Opportunities Of Inorganic Solid Waste Reuse And Recycling In Thika Town, Kiambu County. School Of Environmental Science, Kenyatta University.

Niringiye, A &Omortor, GD. (2010). Determinants of willingness to pay for solid waste Management in Kampala City. Research Journal of Economic Theory 2(3): 119-122, 2010.

Nthambi, M. (2013). An Economic Assessment Of Household Solid Waste Management Options: The Case Of Kibera Slum, Nairobi City, Kenya.Unpublished. University Of Nairobi.

Nyaga J. (2014). Assessment of Wastewater Disposal in Runyenjes Town in Embu County.Department of Civil & Construction Engineering, University Of Nairobi. National Academy of Sciences (USA), 2012.

OECD. (2011). Extended Producer Responsibility: A Guidance Manual for Governments. Paris: OECD Publications Service.

OECD. (2012). Environmental Data: Compendium 2002. Paris: OECD Publications.

OECD.(2014).Addressing the Economics of Waste. Paris: OECD Publications.

Okalebo, S.E., Opata, G.P., &Mwasi, B.N. (2014).An analysis of the household solid waste generation patterns and prevailing management practices in Eldoret town, Kenya. International Journal of Agricultural Policy and Research, 2 (2), 076-089.

Omollo, Maurice Oduor. (2012). The role of the public and the municipal council in the disposal of solid waste in Mombasa, Kenya. ir.library.ku.ac.ke.

Oyeniyi, BukolaAyedemi, (2011), Waste management in Contemporary Nigeria: The Abuja Example, International Journal of Politics and Good Governance. Volume 2, Quarter II, 2011.

Prüss-Ustun, A. et al. (2013) Safe management of wastes from health-care activities, second edition.Publ: WHO, Geneva, 328pp. 978 92 4 154856 4

Role, M. E. (2013). Handbook of social and Educational Research methods for graduate studies. Unpublished manuscript, Department of Educational Administration Curriculum and Teaching. University of Eastern Africa Baraton, Kenya.

Regional Centre for Urban and Environmental Studies. (2014). Detailed Project Report for Solid Waste Management in Agra, Uttar Pradesh. http://localbodies.up.nic.in/Doc181209/DPRs/SWM%20-%20Agra.pdf.

Sakai, S, Hideto, Y, Yushiro, H, Misuzu, A, Hidetaka, T, Shin, T, Keijirou, T, Maria, VP, Jakub, W, Thomas, S, Aldo, RD, Roy, H, Lars, DH, Christian, F, Gil, JO, Li & Ngo, KC, .(2011). International comparative study of 3R and waste management policy developments. J maters cysles Waste management (2011) 13:86-102.DOI 10.1007/s10163-011-0009-x. Published 18 May 2011 with open access Springerlink.com

Science Direct.(2013). "Waste Management".Volume 33, Issue 1 pp220-232.

Sinha M. (2010). Community-based Waste Management and Composting for Climate/Co-benefits – Case of Bangladesh (2d) presented at the International Consultative Meeting on expanding Waste Management Services in Developing Countries, 18-19 March 2010, Tokyo, Japan, http://www.un.org/esa/dsd/susdevtopics/sdt_pdfs/meetings2010/icm0310/2d_Maqs ood_Sinha.pdf

Simon, M.K. (2011). Dissertation and Scholarly Research: Recipes for success (2nd Ed.). Seattle, WA, Dissertation Success LLC

Stringer, R. (2014). Alternative health-care waste treatment technologies: a global inventory. 2014 Edition, 53pp. https://noharm-global.org/documents/global-inventory-alternative-healthcare -waste-treatment-technologies

Tan Yen Joe, (2012), The Management of Residential solid waste in Mombasa, Kenya. Independent Study paper 1388, http://digitalcollection.sit.ed/isp_1388.

The World Bank in Ghana.(2013). Ghana's Comprehensive Approach to PublicProcurement Reform.

Tendayi Gondo (2014). Waste Management Threats to Human Health and Urban Aquatic Habitats in Cape Town.Department of Urban and Regional Planning, University of Venda, Thohoyandou, South Africa.

The (IPCC). (2012). Co-benefits of Waste Management: A Case of Surat, India. Bhopal, India.

UN-HABITAT.(2011). Solid Waste Management in the World's Cities: Water and Sanitation in The World's Cities 2010. London, UK: Earthscan.

UN/DESA, GoJ, and UNCRD, (2010). International Consultative Meeting on Expanding Waste Management Services in Developing Countries 18-19 March 2010, Tokyo, Japan.

UNDP, (2012), World Summit on Sustainable Development, Agenda 21 chapter 21.

UNDP, Lesotho. (2011), Solid Waste Management, Guidelines for Human Settlement and Design Solid Waste Management in South Africa.

UNEP.(2011). International Source Book on Environmentally Sound Technologies for Municipal Solid Waste Management. UNEP Technical Publication 6, Nov. 1996.

UNDP GEF .(2012). Compilation of Vendors of Frictional treatment Technologies. Publ: UNDP GEF Global Healthcare Waste Project, 1pp

UNEP/NEMA (2010).Selection, Design and Implementation of Economic Instruments in the Kenyan Solid Waste Management Sector. UNEP and NEMA, Nairobi

UN-HABITAT, (2010).State of the World's Cities 2008/09– Harmonious Cities. Earthscan, London.

UNEP (2012). Industry as a partner for sustainable development: Waste Management. New York: UNEP.

UNEP.(2013).The Vienna Convention for the Protection of the Ozone Layer.Printed in Kenya by UNON. Published by Secretariat for The Vienna Convention for The Protection of the Ozone Layer & The Montreal Protocol on Substances that Deplete the Ozone Layer

UNEP. (2013). Selection, design and implementation of economic instruments in: Solid Waste Management, Nairobi.

UNEP (2014).The Use of Economic Instruments in Environmental Policy: Opportunities and Challenges, UNEP, Geneva.

United Nations Environment Programme, UNEP. (2009). Developing Integrated Solid Waste Management Plan Training Manual. Volume 2: Assessment of Current Waste Management System and Gaps therein. United Nations Environmental Programme.

United Nations Population Division (2011). World Urbanization Prospects: The 2009 Revision. Key Findings.United Nations Population Division.Isato.

United Nations (2013) Waste Management (2013). [Retrieved from http://www.sciencedirect.com/science/article/pii/S0956053X14000269"Editorial Board/Aims & Scopes"].

United Nations Environmental Programme (2013)."Guidelines for National Waste Management Strategies Moving from Challenges to Opportunities." (PDF)

Willy Kipkoech. (2014). Determinants Of Household Solid Waste Management In Kenya: A Case Of Eldoret Municipality. School of Humanities and Social Sciences, Nairobi University

WairimuMungai. (2014). Factors That Influence Financial Performance Of Private Solid Waste Management Companies In Nairobi County. College of Education and External Studies, University Of Nairobi.

Wambua Musembi. (2012). Factors Affecting Realization Of Integrated Solid Waste Management In Kenya: School Of Education And External Studies, University Of Nairobi.

Wang H., He J., Yoonhee K., Kamata T., (2011). Municipal Solid Waste Management. An Economic Analysis Conducted in Yunnan, China. The World Bank, Development Research Group, Environment and Energy Team: Policy Research Working Paper, 5767

World Bank. (2010). Amman solid Waste Management Project in Jordan, https://www.devex.com/en/projects/amman-solid-waste-management-project-in-jordan (4-2-2013)

World Bank (March, 2010), PPP-Hennet, Public Private Partnerships: solid waste PPPs https://openknowledge Repository-World Bank (2-2-2013).

World Bank (2012) Mainstreaming environmental management in the health care sector: Implementation experience in India and a tool-kit for managers. Vol I & II.Publ: World Bank, Washington DC, 151pp.

World Bank (2013). Urban solid waste management, http://www.worldbank.org (2/March/ 2013)

Xavier, G, Jacobsen, R &Verhelst P,(2010). Identifying the key factors in increasing recycling and reducing residual household waste. A case of the Flemish region of Belgium. Journal of Environmental Management 92(2011) 2683-2690.

Yu Dawei. (2012) Chinese waste: the burning issue; https://www.chinadialogue.net/article/show/single/en/4739-Chinese-waste-the-bu rning-issue

Zikmund, W.G. (2003) Business Research Methods (7thed.).New York: McGraw Hill.

Ziro Ndumbu. (2013).Factors Affecting Public- Private Partnerships Projects in Solid Waste Management in Mombasa County. Extra Mural Studies, University Of Nairobi

Zhuang, Y, Wu, S, Wang, Y, Wu,W& Chen, Y, (2010). Source separation of Household waste. A case study in China. Waste Management 28 (2008)2022-2030.

APPENDICES

Appendix A: Letter of Introduction

Kevin Kalama

P.O Box 97150-80112

Mombasa.

Tel: 0738167426

Email: kevinkalama@yahoo.com

Dear participant,

My name is Kevin and I am a student undertaking a Master of Arts Degree in Project Planning and Management at the University of Nairobi, Mombasa Campus. To fulfill the completion of this course, am conducting research titled, "The effects of solid waste management projects implementation to the welfare of the local community. Since this issue that affects the whole community, I am inviting you to participate in this research study by completing the attached questionnaire and sincerely giving information as per question.

If you choose to participate in this research, please answer all questions as honestly as possible. Participation is strictly voluntary and you may decline to participate at any time. In order to ensure that all the information will remain confidential, you do not have to include your name. The data collected will be for academic purposes only.

Thank you.

Yours faithfully,

Kevin N. Kalama

Appendix B: Questionnaire

Serial No……..

The questionnaire is subdivided into subsections according to basic information and the objectives.

SECTION A: DEMOGRAPHIC INFORMATION

1. Gender of the respondent?

i) Male ☐ ii) Female ☐

2. Respondents position:

Project Manager	
Employee	
Affected resident	
Loader	
County government worker	

3. How long, in years, have you been working on this project?

_____Years

4. What is your highest level of education?

Primary	
Secondary	
Tertiary College	
Undergraduate	
Postgraduate	
Other (specify)	

Section Two: Employment opportunities

1. In your own opinion, do you think that solid waste management projects have led to jobs creation in the Mombasa County? Yes ( ) No ( ).
2. Give reasons for your answer in 1 above

……

……

3. To what extent do you agree that the following have been caused by solid waste management projects implementation?

1-strongly disagree 2-Disagree 3-Neutral 4-Agree 5-Strongly Agree

Statement	**1**	**2**	**3**	**4**	**5**
SW management projects have led to Menial Jobs creation at all phases					
SW management projects have led to Management Jobs creation all phases					
SW management projects have led to Self-Employment Jobs creation all phases					

Section Three: Health

4. Do you think that solid waste management has health effects to both animals and human being in the county?
5. With relevant examples, give some reasons as per your support of the above from any project you know

……

……

……

6. To what extent do you agree that the following statements relate to the life of the people of Mombasa County in relation to solid waste management?

1-strongly disagree 2-Disagree 3- Neutral 4-Agree 5-Strongly Agree

Statement	**1**	**2**	**3**	**4**	**5**
Solid waste management projects have led to Water Borne Diseases					
Solid waste management projects have led to Air Borne Diseases					
Solid waste management projects have led to Infant Mortality					

Section Four: Training Practices

7. Do support the idea that Social Conflicts have been brought into your area due to solid waste management projects implementation? Yes ( ) No ( ).
8. Support your answer from relevant projects.

---

9. To what extent do you agree or disagree with the following statements?

1-strongly disagree 2-Disagree 3- Neutral 4-Agree 5-Strongly Agree

Statement	**1**	**2**	**3**	**4**	**5**
Solid waste management projects have accelerated Quarrels in Mombasa county					
Solid waste management projects have accelerated Demonstrations in Mombasa county					
Solid waste management projects have led to Contractual Wars					

Section Five: Environmental Pollution

10. In your own opinion, do you think that Environmental Pollution has been due to solid waste management projects in Mombasa County? Yes ( ) No( )
11. What are the possible reasons for your answer above? ----------

---

---

12. To what extent do you agree that the following statements?

1-strongly disagree 2-Disagree 3- Neutral 4-Agree 5-Strongly Agree

Statement	**1**	**2**	**3**	**4**	**5**
Air Pollution has been an issue due to solid waste management projects					
Water pollution has been on the rise due to solid waste management projects					
Land pollution is a key issue in SW management projects					