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Minimization of the Cost of Solid Waste Management through Alternative Financing
Mechanisms in Kajiado County

Sirengo Enid Nafula

Submitted in partial fulfillment of the requirement for award of Degree of Master of
Commerce at Strathmore University



School of Management and Commerce
Strathmore University
Nairobi, Kenya

JUNE, 2016

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16th June 2016

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Abstract

The need for investment in the Solid Waste Management (SWM) sector in Low- and Middle Income Countries (LMIC) far outstrip their financial resources. The real challenge for LMIC is to set up sound SW management for both economic and ecological reasons. One of the Solutions recommended is the involvement of other sectors which will provide alternative sources of finance for managing solid waste. To succeed in waste management, adequate financing is needed. This study aimed to demonstrate both theoretically and empirically that traditional financing is inadequate and thus alternative financing methods are necessary to curb and minimize the costs of Solid waste management.

This study was carried out in Kajiado County which is located south of the former Rift Valley province and now county under the new administrative boundaries as per the new constitution.

The main objective of this study was to explore the potential of employing alternative financing mechanisms in managing municipal Solid Waste in Kajiado County of Kenya with a view to minimize the costs of SWM.

To investigate the potential of employing alternative financing to minimise costs of SWM, this study used a combination of both quantitative and qualitative methodologies to research. It therefore draws on the cross-sectional study design as explained by Bryman (2004) and also on aspects of a phenomenological research design as discussed by Blanche et al., (2006).

Statistical analysis showed that there is a great chance that alternative financing reduces the costs of SWM. Other findings revealed that the majority proportion of the public in Kajiado County exhibited concern that with the amount solid waste being generated there is not enough financial resources to pay for the costs involved. Though some within the county still believe that Solid waste Management is the responsibility of the government, a majority agree that other alternative financing methods need to be sought out to effectively manage solid waste. Not a single mechanism has been unanimously agreed upon. The alternative financing mechanisms discussed within this paper include private sector participation, micro finance involvement through SWM projects and use of a combination of both private and public sector participation.

From the regression one could deduce that despite their being a high level of awareness of different alternative approaches to solid waste management, there is little uptake of the same. As such, policy makers should concentrate on building capacity within the councils to be able to pursue these options of guiding organizations to uptake alternative financing methods. Thus, more resources should be incurred not on creating awareness of alternative financing mechanisms for solid waste management but in laying down structures to actually obtain financing from alternative sources for enhanced SWM for a cleaner and environment friendly society.

Political, cultural and social concerns also prevent the topic of solid waste management to be discussed openly.

It is evident from the exponential growth of people migrating from urban to peri-urban regions like Kajiado and increased levels of illegal dumping sites that the government can no longer manage to finance for SWM on its own.

There are successful stories from other countries like Bolivia, The Philippines and Argentina. This study wishes to open a forum within the county and encourage the uptake of employing alternative sources for financing SWM activities.

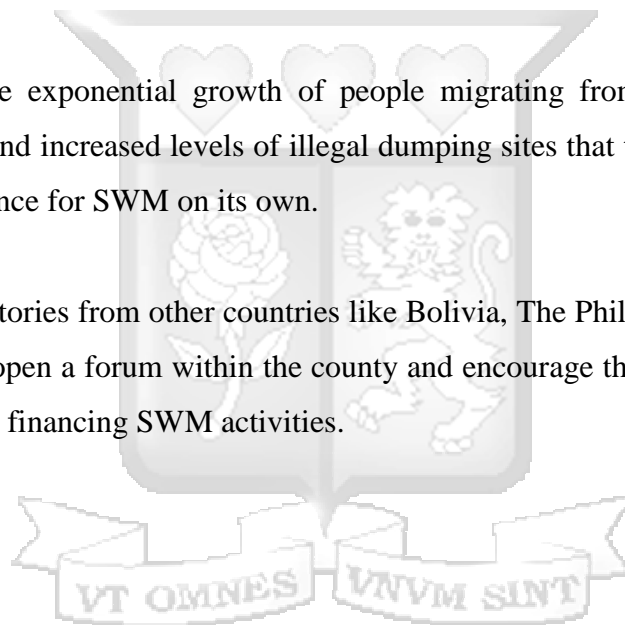
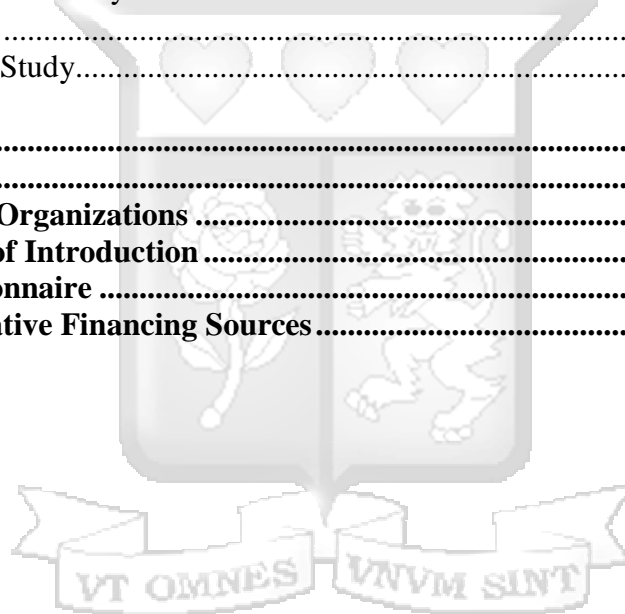


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List of Abbreviations

CBO's	Community Based Organizations
CSR	Corporate Social Responsibility
CVM	Contingent Valuation Method
GNP	Gross National Product
GNP	Gross National Product
KC	Kajiado County of Kenya
KCB	Kenya Commercial Bank
K-MEPP	K-MEPP microfinance
KRC	Kenya Red Cross
K-Rep	K-Rep Bank
KWFT	Kenya Women Finance Trust
LMIC	Low- and Middle Income Countries
MDF	Municipal Development Fund
NCC	Nairobi City Council
NGO's	Non-Governmental Organizations
NPV	Net Present Value
OBA	Out-Based Aid
OECD	Organization for Economic Co-operation and Development
RDF	Refuse Derived Fuel
SPSS	Statistical Package for Social Sciences
SWM	Solid Waste Management
TNUDF	Tamil Nadu Urban Development Fund
UNEP	United Nations Environmental Program
WTE	Waste to Energy

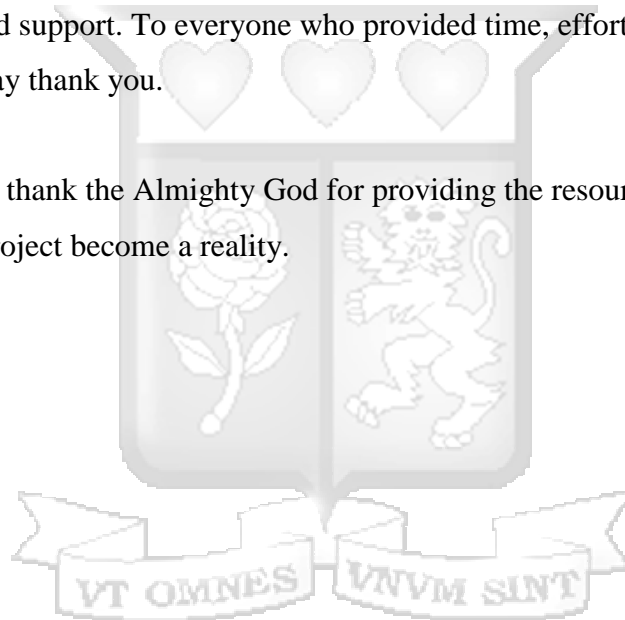
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CHAPTER 1: INTRODUCTION

1.1 Background of the Study

Increasing population, urbanization, industrialization and changing consumption patterns are resulting in the generation of increasing amounts of solid waste and diversification of the type of the solid waste generated. Solid waste is the most visible environmental problem among many in urban areas. Increased solid waste generation creates more environmental problems in many regions, as many cities are not able to manage it due to institutional, regulatory, financial, technical, and public participation shortcomings (Visvanathan & Glawe, 2004). The inefficient and inadequate waste management systems in many urban centres throughout many countries globally are largely due to a number of factors among them rapid urbanization, inadequate funding of waste management services, frequent breakdown of refuse collection vehicles and lack of skilled staff (Emerging issues in urban waste management workshop –Harare).

According to Rotich and Yongsheng (2006), the sustainability of the land filling system and obtaining sites for new landfill for solid waste is becoming increasingly difficult and expensive. Locating a landfill far away from the source of waste generation increases transfer costs and additional investments for the infrastructure of roads, hence intensifying the financial problems of the responsible authorities (Rotich & Yongsheng, 2006).

Solid Waste Management (SWM) has emerged as one of the greatest challenges facing municipal and county authorities in many countries especially in Africa and has become a specific problem among countries within Eastern and Central Africa e.g. Zimbabwe, Zambia, Tanzania, Uganda and Kenya. The volume of waste being generated continues to increase at a faster rate than the ability of the municipal authorities to improve on the financial and technical resources needed to parallel this growth. Deliberation on the possible practical solutions to minimize costs of solid waste management challenges bedevilling the local authorities (Yhdego, 1995) is eminent.

Domestic and industrial solid waste poses a serious challenge to municipalities and counties, as waste now competes with humans for land and financial resources to make it safe (Ndeto, 2009). Waste management is constrained by a lack of financial and material resources resulting in a failure to assist residents in waste storage, failure to collect and transport the waste, resulting in residents and businesses resorting to illegal dumping, burning,

composting, and burying the waste at the generation site (Musademba et al., 2011). There are several challenges facing the effective disposal of solid waste. Among them budget constraints are a chronic issue (World Bank, 1999). Nearly 87% of the solid waste budget utilised to pay salaries and wages, as such scarce resources are left to improve or expand services.

SWM is defined as the application of techniques to ensure an orderly execution of the various functions of collection, transport, processing, treatment, and disposal of solid waste (Robinson, 1986). It aims at an overall waste management system which is the best environmentally, economically sustainable for a particular region and socially acceptable (World Resource Foundation, 1996; McDougall et al., 2001). SWM is indeed a complex matter for emerging countries. Africa, being the continent with the poorest countries faces dire constraints in the management on solid waste. It is estimated that globally, cities spend no more than 0.5% of their per capita Gross National Product (GNP) on urban SWM. This is further estimated to be a mere third of the total cost of SWM. The majority of these costs, at about 80%, are costs from collection of the solid waste (Ndeto, 2009).

Alternative financing methods are thus necessary to plug in the resulting financing gap. More finances also need to be channelled to other waste management processes such as recycling. The current practice of collecting, processing and disposing municipal solid wastes is also considered to be least efficient in most developing countries. The typical problems are -low collection coverage and irregular collection services, crude open dumping and burning without air and water pollution control, the breeding of flies and pests, and the handling and control of informal waste picking or scavenging activities (Bartone, 1995). Although some cities do spend significant portions of their municipal revenues on waste management (Bartone, 2000), they are often unable to keep pace with the scope of the problem.

Senkoro (2003) indicated that for many African countries, only less than 30% of the urban population has access to proper and regular garbage collection. One of the principal reasons for the inept SWM systems in developing countries is the financial constraint. SWM is given low priority, and very limited funds are provided to the SWM sector by the government. SWM services are a public-good in their nature thus there are imperative social and economic benefits that should be considered in deciding the level of services to be provided, though governments may have insufficient budgetary allocation. In Kenya, the SWM budgetary allocations for the Nairobi city Council in the 2003/2004 financial year were: 78.4% wages;

21% operations and maintenance and a meager 4% for service delivery. In 2011, with an annual budget of 121million U.S dollars, allocation for environment conservation was 7.1million dollars while SWM had 4.1million dollars for the 4million residents while the city requires at least 17 million dollars per year in order to handle the problem adequately (Mutai & Njoroge, 2012).

SWM practices in Kenya envisage the “polluter pay principle” where every polluter must meet the cost of disposing the waste in question. Similarly, every waste generator has a duty to ensure safe disposal of the waste. According to Afullo and Odhiambo, (2009), an individual’s choice of involvement in a certain SWM practice, together with the technical and organizational nature of appropriate solutions, depends significantly on the country’s economy and on the economic situation and context in the particular environment where they live. This in effect translates into revenue for those who participate in the SWM practices. It is important to note that the levels of contribution of this livelihood sources have neither been quantified nor documented (Afullo & Odhiambo, 2009). Muniafu, and Otiato, (2010) noted that there have been efforts by non-governmental organizations working with communities to recycle waste such as paper, plastic and metals. The impact of this however, remains minimal; a claim that was not however supported by any evidence.

Despite the amounts allocated for sanitation, a large part of Kenya is still lagging in terms of SWM. For instance, only 1.5% and 0% of Kajiado central’s urban and rural populations have access to a sewerage system. Of these, only 1.4% and 0.6% have a septic tank (Sanitation by District, 2009). SWM receives little prominence in both the central government’s and local government’s fiscal policies. This is because of the more urgent funding needs such as health care and education. However, it is important that the Kenyan government and local governments recognize the importance of SWM in the society and allocate much more funding to tackle the impact of solid wastes on the society.

Some widely used financing mechanisms for SWM include fines, penalties, charges and levies on the residents, environmental funds, annual budgets of the central government and the local government, donor funds and funds from the private sector (UNEP, 2009). In Kenya, the largest share of financing for SWM comes from the central government through its annual budgetary allocations. The Kenyan government, between the years 2008 to 2009, spent 30.5 billion shillings on water, sanitation, and SWM programs out of which 27.4 billion was spent on environment, 163.7 billion on public works, 118.3 billion on education,

(Spending by Sub-Sector, 2009). The total amount spent on sanitation was a mere 3.59% of the total expenditure for the financial year.

Private sector organizations also participate in SWM financing through Corporate Social Responsibility (CSR) initiatives. Examples of organizations that engage in SWM as part of their CSR include Safaricom through the Safaricom Foundation, Standard Chartered Bank and the Kenya Commercial Bank. Their support includes financing of SWM programs, sensitization, and mobilization of the community to engage in CSR activities and involvement of their staff in community activities aimed at enhancing SWM. (KCB approves CSR Plan, 2005). A substantial level of financing for SWM in Kenya is also received from Non-Governmental Organizations (NGO's). These include international and local donor organization. For instance, the Kenyan Red Cross (KRC) is involved in SWM financing through its water and sanitation department (Kenya Red Cross, 2011). The belief of the KRC is that financing for sanitation and SWM should follow an alternative community based approach.

The growing population in Kenya coupled with the migration of people from rural to urban and urban to peri-urban regions like Kajiado has led to an increase in the level of solid wastes generated. Kajiado, for instance, has seen its population grow exponentially to a figure of over 400 thousand as at 2009. Infrastructural developments around the city has opened up remote areas like Kajiado, previously seen as remote, to the city dwellers. The costs of managing solid waste is bound to increase in light of the rapid increase in population and the imminent rapid urbanization of the county as populations migrate from the neighbouring Nairobi into this vast region (Kajiado District, 2005). This in turn has resulted in the need for the increased SWM mechanisms, equipment, and personnel in such areas. Preparedness for the inevitable increase in the cost of managing solid waste through seeking out alternative financing mechanisms to be employed by the Olkejuado County and the Kajiado Town Councils in financing SWM is important.

Kajiado County of Kenya lies south of the former Rift Valley province and now county under the new administrative boundaries as per the new constitution. Kajiado County of Kenya is bordered by Tanzania to the South West, Taveta County to the South East, Machakos County to the East, Nairobi County to the North East and Kiambu County to the North (Kajiado County of Kenya, 2011). Kajiado covers an area of about 22,000 kilometres squared and has a population of about 400,000 people. The county is divided into 7 divisions, which are

Ngong, Magadi, Isinya, Central, Namanga, Mashuru and Loitokitok. The county has two local authorities that are mandated with the task of managing its solid wastes. These are Olkejuado County Council and Kajiado Town Council (Kajiado District, 2005).

The situation in Kajiado County of Kenya is synonymous with the general trend around the globe. The global population is growing just as rapidly as development is stretching its tentacles to the most remote parts of the globe. This has resulted in much greater solid waste generation and thus the need for improved solid waste management methods. As such, authorities, in Kajiado County of Kenya and around the globe can no longer rely on traditional solid waste management financing sources. There is need for the development of alternative approaches towards the financing of solid waste management both in regions in developing countries such as Kajiado County of Kenya and in the developed world.

As such, alternative financing mechanisms may be defined as institutional arrangements that enhance the transfer of new sources of funds or increase of existing sources of funds towards projects aimed at reducing the amount of solid waste in society and the subsequent environmental degradation (Meijerink, Diemont, Dolf De, Raymond, & Verhagen, 2008). Many developing countries, Kenya included, are in the process of seeking out new financing approaches to fill the gaps in financing SWM. There is need to depart from the conventional thinking that the government should be the primary funder of development projects. Due to increased budgetary pressure from fiscal deficits, the amounts set aside for SWM by central governments is limited. These have created a need for assessing SWM issues. This is necessitated by the fact that cash transfers, grants, and concessional loans advanced by both bilateral and multilateral donors can only adequately finance a small portion of SWM (Billand, 2006).

The task of solid waste management (both collection and disposal) is not within the financial capacity of municipal councils. A large percentage (about 80%) of the total waste management costs in low-income countries is collection costs (World Bank, 1999). The problem is more pronounced in emerging countries especially those in Africa. This has in turn led to the need for an increase in financial resources for SWM. Governments do not carry the burden of financing waste management alone. They receive assistance from local governments, Non-Governmental Organizations (NGOs), and international donors. However, these funding is not sufficient. Alternative financing mechanisms for SWM are therefore necessary to tackle the ever-increasing need for SWM handling in the society.

Financing mechanisms for SWM are dependent on the individual ecosystems existing in a certain environment. As such, what is alternative in one environment may not necessarily be alternative in another. The term alternative financing is broad in that it involves different financing instruments and procedures intended for divergent goals. It would thus not be possible to discuss all available financing mechanisms in one paper. Alternative financing mechanisms are important in tackling the problem of SWM. Available estimates of global spending on SWM and other environmental issue are an annual figure of 6.5 billion dollars. This figure falls short by 2.3 billion dollars of what is actually needed to comprehensively finance SWM activities among other ecological activities. The majority of this shortage in financing is experienced in developing countries such as Kenya (Meijerink, Diemont, Dolf De, Raymond, & Verhagen, 2008).

1.2 Statement of the Research Problem

The solid waste sector in developing countries has not been able to provide adequate and sustainable solid waste service to the people. The main problem in cities in developing countries is inadequate finances to pay for the costs of SWM services for the people and Kenya is no exception. The poor state of solid waste management – inadequate coverage, irregular waste collection, indiscriminate dumping, waste spill over from bins and storage containers, and waste littering – leaves much to be desired. The local governments which are responsible for solid waste management are faced with two problems. First, there is inadequate access to solid waste service especially in the middle and low income urban communities. Second, finances to manage the solid waste generated.

Public services such as water supply and solid waste collection have traditionally been organized by the public sector.

SWM, despite being crucial to any sustainable city, is still neglected by local authorities and by the private sector. The importance of SWM to sustainable development and cities is being ignored. Very limited experiments in the field of alternative financing have been successfully implemented (World Bank, 1998). The World Bank Group and the Organization for Economic Co-operation and Development (OECD) are some of the few international institutions carrying out research in the field of alternative financing mechanisms for SWM in general, and in the field of Private Sector Participation (PSP) in SWM.

However, a thorough analysis of the natural complexities of solid waste services (collect, transfer station, transport, and landfill management) has yet to be carried out. Thus, the debate of the extent of how much participation from other sectors is subject to bias.

Solid Waste Management has traditionally received inadequate funding especially in emerging countries, most of which are in Africa, like Kenya. This is largely because of the presence of more pressing fiscal issues such as healthcare, education and security amid tight revenue sources (Billand, 2006). Studies surrounding solid waste management have largely been based on the west and in emerging developed economies mostly in the Middle East such as India. Few studies have concentrated on solid waste management financing constraints facing emerging African nations and African situations. From various studies, it is evident that there is limited capital base and reliance on limited avenues for financing solid waste, the overreliance on government budgets and collection fees.

There is need for county councils such as those in Kajiado to seek alternative financing for SWM activities. Despite the need for alternative financing sources for handling of solid wastes, little research has been conducted on alternative financing mechanisms for SWM available to County governments in Kenya. Knowledge from this study will be important in guiding policy makers in county governments on the viable available alternative financing mechanisms for SWM in their regions of governance. The scope of the study was Kajiado County of Kenya, to ascertain the current financing mechanisms used for SWM. As such, this study has explored alternative sources of financing SWM to improve and increase sources of capital for minimizing the cost of managing solid waste. This study has concentrated specifically on Kajiado County of Kenya, a semi urban county in Kenya. The study also sought to establish alternative financing mechanisms for SWM that are available to county governments in Kenya and their potential impact on the minimization of the costs for management of solid wastes. The results of the study form an important reference point for other developing nations seeking to tackle solid waste management financing problems.

There is paucity of available literature on alternative financing mechanisms for Solid Waste Management applicable in Kenya especially in view of the devolved form of government where different regions will be governed by different county governments. These county governments will be in charge of financing SWM in their areas of governance. The importance of alternative financing mechanisms for SWM to counties in Kenya cannot be

underestimated. However, despite its importance, no one has collected specific data for its study. There is also very limited information on alternative financing mechanisms and studies on suitability of the different microfinance institutions and the role they could play in SWM.

As such, this study has explored alternative sources of financing SWM to improve and increase sources of capital for minimizing the cost of managing solid waste. This study has concentrated specifically on Kajiado County of Kenya, a semi urban county in Kenya.

1.3 Objectives of Study

This study explored the potential of employing alternative financing mechanisms in managing municipal Solid Waste in Kajiado County of Kenya with a view to minimize the costs of SWM. The specific objectives were to:

- a.) Identify costs of solid waste management, the existing mechanisms and their challenges for financing Solid Waste Management in Kajiado County.
- b.) Explore the potential for implementing alternative financing systems for financing Solid Waste Management in Kajiado County.

1.4 Research Questions

The proposed research answered the following questions:

- a.) What are the current costs for managing Solid Waste mechanisms in Kajiado County?
- b.) What financing mechanisms (both traditional and alternative) were available for financing solid waste management in Kajiado County of Kenya?
- c.) What alternative financing mechanisms can be applied in Kajiado County to minimize the costs of SWM?

1.5 Justification of Study

There is a growing awareness of existing gaps that need to be filled and also the need to understand the level and nature of demand-led alternative financing. Alternative financing seeks to maximize harmonization and collaboration with funding agencies to support effective decentralisation of services and decision-making, and to help utilities to become commercially viable. Alternative financing seeks ways to leverage local liquidity and to approach other financing options e.g. microfinance to the sector. These essentially means

that, poor people too can access funds and therefore, paying for services at affordable costs that are predictable and spread over a longer period.

At the national level, governments should be assisted to shift financial resources to develop bodies to match their new responsibilities and to finance effective structure and practices that are demand responsive. Brazil and the Philippines are the real world examples that are cited to meet these challenges: participatory budgeting in Brazil (Roberto, & Paixao, 1996), and the use of Municipal Development Fund (Philippines Local Water Utilities Administration, 2006). Public private partnerships, for example, have been used into transforming water and sanitation services. Empowering local government organizations to raise funds has proved effective in increasing sanitation coverage. In Burkina Faso for example, a sanitation surcharge is used to develop services and skills and to generate demand so that people can finance their own onsite sanitation (Savina, & Kolsky, 2004). At the county level, microfinance can stimulate the small-scale private sector and allow households to manage the capital costs of starting or connecting to services. Utilities and municipalities can form associations to access finance. Ghana for example, has through revolving funds, contributed to the water and sanitation infrastructure.

This study therefore has sought to contribute to the body of knowledge by discussing the possibilities of applying alternative financing sources as a way of minimizing costs of SWM in county councils. It provides an unconventional approach stressing a departure from the current practice where the government through its fiscal policies and donor partners finance SWM. It emphasizes active participation by the residents and the leaders of county governments in seeking out financing options for solid waste management. The study also contributes to the different works on academic debates carried out by various scholars, and organizations like the OECD.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The literature review looks at the academic literature in areas surrounding solid waste management and alternative financing mechanisms for SWM. It starts by looking at SWM and the various functions within it. It proceeds to analyze the various alternative financing mechanisms available for financing SWM around the globe and for emerging countries, among them; microfinance, financial markets financing, private sector financing, grants and repayable financing, output based aid, grouped financing vehicles and project preparation facilities. Further, the literature review also examines areas where alternative financing mechanisms for SWM have been found to be successful and their challenges. It continues to identify the gaps in the literature and finally gives a summary and conceptual framework.

2.2 Solid Waste Management

Research into solid waste management has been conducted by various scholars among these Asnani (2006), UNEP (2005), Hosetti (2006) and Ndeto (2009). SWM is an integral part of the society and a necessity for avoiding wanton environmental degradation. SWM requires an integrated approach to the management of waste. Integrated SWM is the frame of reference from which new approaches to SWM are created and from which old approaches are analyzed and optimized. According to Diaz, Savage, Eggerth, Rosenberg, and UNEP (2005), an integrated approach is necessary because it enables the resolving of SWM problems.

It enhances the optimization of financial resources and capacity of the waste management body and allows for the participation of various players such as the public, private, and informal sector participants. Integrated approaches also help in the identification and selection of low cost approaches to SWM as compared to options that are more expensive. Robinson (1986) defines SWM as the application of techniques to ensure an orderly execution of the various functions of collection, transport, processing, treatment, and disposal of solid waste. The World Resource Foundation (1996) and McDougall et al. (2001), assert that, SWM should be a method that is good for the environment, economically sustainable for a particular region and socially acceptable. Hosetti (2006) argues that SWM is not a single activity but is made up of a series of activities, all of which have a cost implication. SWM involves the collection, transportation, and disposal of the solid wastes. The costs of collection, transportation and disposal vary with distance and methods used.

Asnani (2006) states that waste can also be converted to energy to save on costs, but argues that waste to energy (WTE) projects have not been proven economically viable or sustainable. This is because, the projects require high financial investments and thus pose high risk, quality waste and must comply with statutory regulations. As such he argues that investing in such technologies within a limited budget might not minimize the costs of managing waste in the short run. Asnani (2006) further states that economic benefits can be derived from solid waste such as through the production of Refuse Derived Fuel (RDF) or Pelletization uses solid waste in the production of enriched fuel for use in incinerators and industrial furnaces. This process results in the production of fuels from the waste. It however requires a lot of capital and energy to run successfully. Sanitary landfills and landfill gas recovery. This method is not costly and may result in environmental gains if landfills contain organic wastes (Asnani, 2006).

2.3 Solid Waste Management General Challenges

Solid waste management poses many challenges to the society. Among the challenges faced by emerging countries, include the inability of their public sector to cope with the solid waste generation in their areas of governance. This is because they have obsolete equipment for handling solid waste. This includes insufficient and poorly maintained vehicles. Other problems include lack of well-trained and adequately motivated staff to handle solid waste management (Zerbock, 2003). In Kajiado County of Kenya and the larger Kenya, solid waste is disposed off through open dumping. The impact of this on surface and ground water is adverse with pollution of clean drinking water sources being highly likely.

The open dumping areas are insufficiently planned due to limited, adequately trained staff. Open dumping poses lots of hazards to the environment and society. Inadequately planned open dumping can be blamed on inadequately trained staffs (Henry, Yongsheng, & Jun, 2006). Political interference of bodies tasked with solid waste management at the grass root level is common in developing nations. The leadership in these bodies are as a result more concerned with being politically correct as opposed to concentrating in service delivery. As a result, solid waste management has suffered due to inadequate attention by the people in charge, mismanagement of solid waste management funds and corruption (Henry, Yongsheng, & Jun, 2006).

2.4 Solid Waste Management Financing Challenges

In emerging nations, solid waste management is treated as a low priority area, receiving only little attention from the authorities. This is in light of other higher priority areas such as the provision of clean drinking water, health care, education, and security (Billand, 2006). The result of this has been under funding of solid waste management activities. Local governments have inadequately developed revenue collection capabilities resulting in an inadequate financial framework for the development of a sufficient financial base for the delivery of services, among these solid waste management services. The lack of a clear framework to engage the private sector in providing financing and services further aggravates the problem (Selection, Design, and Implementation of Economic Instruments in the Kenya Solid Waste Management sector, 2004).

Recycling costs are relatively high as compared to the revenues the recycled products fetch in emerging countries. This is largely because of low buying power among a majority of the population. This as a result makes solid waste financing an unattractive venture in emerging countries unless it is heavily supported by the government policies in place. Such policies include the provision of tax rebates, subsidies, and infrastructural support. Sustainable financing for solid waste management in emerging countries is an enormous endeavour, not one that cannot be surmounted though (Urban Solid Waste Management, 2011). The government needs to provide a clear framework, policies, and the necessary support to attract the much-needed financing towards solid waste management. Such includes the development of structures to support private sector participation and community involvement in solid waste management. Such an approach will go a long way in increasing financing towards solid waste management and as a result efficiency and effectiveness of solid waste management (Financial Capacity Building, 2011).

2.5 Alternative Financing Mechanisms for Solid Waste Management

Alternative financing mechanisms can be described as alternative capital sources for financing of SWM activities. SWM activities include collection of solid waste materials at source, transportation, and treatment at destination. The cost of SWM is enormous. Nairobi City Council (NCC), the council in charge of the capital city's amenities management spends 15% of its annual expenditures on SWM (Managing Solid Waste in Nairobi City, 2007). Alternative financial approaches to SWM require a creative way of using commercial instruments plus available funds allocated for the sector from other sources e.g. government

and international agencies. With the expertise of the sector's non-profit players (NGO's) it is possible to bridge the implementation gap by reducing the associated risk. Sijbesma, Diaz, Fonseca, and Pezon (2008) argue that alternative financing mechanisms and approaches are designed to address the key failures of the traditional approaches.

According to UNEP (2009), alternative financing mechanisms are about coming up with non-conventional financial mechanisms for financing solid waste management. Traditionally, SWM has been financed from the government's fiscal expenditures and council's budgetary allocations. However, in the current age, other financing options are increasingly in use as financing options for SWM. These alternatives include financing from micro finance institutions, private institutions, donors, and capital markets. Some of these financing options are discussed herein as alternative financing mechanisms for SWM that may be adopted by developing countries to finance their SWM needs.

Sijbesma, Diaz, Fonseca and Pezon (2008) assert that the potential of alternative financial approaches and mechanisms can be huge especially when it embraces a wider range of initiatives designed to build inclusive financial systems for the poor e.g. microfinance. Nzeadibe and Ajaero (2010) feel that SWM in developing countries like Kenya is comprised of the government and the informal sector. The informal sector includes of individuals and small and medium sized enterprises. Despite these, the sectors contribution to solid waste management is not given due support in a majority of the developing countries. As a result, these individuals, businesses, and organizations face a chronic lack of financing sources for their operations and growth. Formal financing institutions such as banks, credit institution and even microfinance institutions have ignored this sector. Microfinance can, by providing products tailored for this sector, enhance solid waste management financing and create an additional revenue stream and client base.

In their contribution, Gassner, Popov and Pushak (2009) indicate that microfinance provides a major opportunity for overcoming affordability constraints in SWM, particularly in emerging countries. The use of microfinance has so far been limited in the SWM sector, partly due to a lack of awareness and limited understanding on the part of microfinance professionals on the potential that solid waste management holds in growing their customer base and revenues. Metha (2008) supports Gassner, Popov and Pushak (2009) arguments by indicating that the potential for rapid development of microfinance in the SWM sector has

been undermined somewhat by primarily focusing on core markets and exclusively financing income generating activities (Mehta, 2008).

Mehta (2008) further agrees that an increase in the poverty levels and the level of solid waste dumping raises the need for microfinance institutions to create products targeted at businesses that engaged in SWM as a way of fighting social inequality and unemployment. According to him, governments can boost the lending capacity of microfinance institutions by creating revolving funds for financing organizations engaged in SWM. Donors can help build awareness of microfinance products, through capacity building activities or blending microfinance with other types of financing instruments in the solid waste management projects they choose to support (Mehta, 2008).

The role of microfinance institutions is important as a source of financial innovations in implementing government strategies for promotion of SWM in Kenya. The role of microfinance institutions is to create financing space for households, communities and market based resources. These will open up more options for leveraging financial resources for solid waste management. Microfinance is expected to help the development of SWM in two ways. First, it will contribute by providing poor rural communities with adequate access to finance for the installation of SWM facilities and secondly, increased financing and business will spur overall economic development in the poor rural areas. Providing finance to these organizations will also support local private sector institutions participation in SWM and other environmental issues through stimulating this sector by providing it with opportunities for services in construction of sanitation facilities.

In Kenya, local micro-finance institutions such as K-Rep, Kenya Women Finance Trust (KWFT), Equity Finance, Agricultural Finance Cooperation (AFC) and K-MEPP can be approached to engage in environmental conservation through including SWM in their financial products portfolio. SWM can be turned into a profitable venture if sufficient support is provided. Ledgerwood and White (2006) believe that this support should be in the form of Government incentives as well as increased financing options for SWM activities. Studies concentrating on the productivity of SWM should be carried out to encourage microfinance institutions to provide financing to this sector, not just for the environmental benefits but for the economic benefits as well. Assistance should be provided to microfinance institutions to help them establish a portfolio for the SWM sector. A full assessment of the impact, risk, and profitability of providing financial assistance to this segment of the market should be done to

protect microfinance institutions from unnecessary partial or whole loss of funds (Ledgerwood & White, 2006).

It has been shown that efficient capital markets enhance economic growth. However, developing countries like Kenya are characterized by narrow and shallow capital markets with only a small portion of institutions being able to raise financing from both the stocks and bonds segments. Financial markets can be a source of financing for SWM in Kenya and other developing countries. Financial markets offer various funding opportunities such as Equity and Bonds for the private sector. Financial markets are considered a cheap source of capital for private companies (Ngugi, Amanja, & Maana, n.d). However, to obtain financing from the capital markets, organizations have to comply with a set of stringent listing rules, many of which cannot be met by organizations engaged in solid waste management.

Ndeto (2009) elucidates that the financial markets can finance growth in the solid waste management sector through either private equity or bonds. The market can enhance private solid waste management company's ability to raise funds by recognising them as viable economic activities and perhaps creating a special segment for them to sell their stocks. These would enhance their ability to raise equity financing from the capital markets. In addition, to ease the entry of solid waste management organizations, the government can back their listing through creating special funds as security to those who invest in them or even securitizing bonds issued for purposes of solid waste management. Over time, this grows the private sector confidence, minimizing the role of government. This has already been experienced by some international locations such as the Indian State, Tamil Nadu, where its Tamil Nadu Urban Development Fund (TNUDF) has evolved from being fully backed the municipal to a fund backed jointly by the private and public sector (Ndeto, 2009).

Municipal and County bonds can be issued in the international environment with the backing of the central government. Under the new constitution passed in August of 2010, County governments can with the approval of county assemblies issue bonds in the international and domestic financial markets if the national government guarantees the loans (Constitutional Reforms, 2010). This will be an opportunity for the Counties to enhance their solid waste management capacity, as they will be able to obtain financing to upgrade their capacity to effectively manage solid waste. This financing may be used for acquiring capital goods such as solid waste management trucks, building solid waste treatment plants, and financing recycling plants. As such, the County governments should fully exploit this window to seek

funds from the local and international financial markets to enhance their solid waste management capability.

According to Ndeto (2009), the private sectors involvement in solid waste management is important in increasing financing to the sector among other benefits such as the transfer of management expertise, technological knowhow, and improving the capacity of solid waste management institutions. Diaz, Savage, Eggerth, Rosenberg and UNEP (2005), support that private sector participation in solid waste management and identified it as a source of modernization funds for solid waste management. To attract full private sector participation in financing solid waste management, the public sector should change its role from being a solid waste management service provider to being a solid waste service enabler, focusing on providing the framework for the participation of the private sector and in regulating private sector activities in the sector. The public sector should identify solid waste management areas that can be outsourced to the private sector to enhance the financing input of the private sector (Diaz, Savage, Eggerth, Rosenberg, & UNEP, 2005).

Murray, Cofie and Drechsel (2011) believe that involving the private sector opens up opportunities for reducing costs in solid waste management ventures. However, the private sectors' participation in solid waste management, value can be created out of solid wastes in the form of production of compost that has economic benefit to farmers, production of faecal sludge as a fuel for industrial use, in aquaculture, and the production of biogas for cooking. These activities, though capital intensive, help create revenue from reuse of solid waste management, such revenue goes a long way in offsetting solid waste management costs. These is an attractive option for private sector players as they are revenue focused and the prospects of making profits out of solid waste management will attract them towards providing finances to the sector.

Koppenjan and Enserink (2009), approach the involvement of Private Sector participation in SWM with pessimism.

According to them, the fact that the private sector is predominantly concerned with the short-term return on investment as opposed to long-term returns, they believe that this may jeopardize solid waste management activities in the long term. For instance, solid waste management financing contracts with the private sector may contain unsustainable repayment terms and interest expectations. They argue that, this may end up hurting the overall solid waste management function over time. As a result, government oversight and regulations are

important in the formulation of financing partnerships between the private sector and local councils for solid waste management. Winpenny and Limited (2008) propose grants and repayable financing as an alternative source of income for SWM.

The main objective of blending would be to attract funds that would otherwise not be attracted by a given project. These form of financing hold a great potential in the solid waste management sector where the element of subsidies will usually be required (Winpenny & Limited, 2008). According to OECD (2009), grouped financing vehicles are a helpful way to provide access to a large number of relatively small borrowers, this type of financing is well-suited to decentralized solid waste management sectors like the solid waste management activities in Kajiado County of Kenya, in which small and medium sized households are struggling to access financing on their own merit in order to promote solid waste management (OECD, 2009). Payen (2009) says that project preparation facilities can help with the definition and preparation of bankable solid waste management projects. In Kajiado County of Kenya, they can be particularly useful to assist households and Small and Medium Enterprise's (SME's) with limited project preparation capacities to develop projects that can attract repayable finance (Payen, 2009). Special funds, project development support and credit enhancements are still relevant in many countries as sources of funding for solid waste management (Grants and Funding, 2011).

2.6 Merits and Demerits of Public-private Partnerships and Alternative Financing Mechanisms in Solid Waste Management

Alternative financing mechanisms have been found to work in many areas among them developed and developing countries. Ndeto (2009) gives an example of Dar es Salaam where prior to privatization of solid waste management, the City Commission could only manage 2-4% of the waste that was generated on a daily basis. This resulted in a solid waste crisis in and around the capital. This was to change with privatization of solid waste management through the award of a sole contract to a private company. Since this, solid waste collection went up to 75% of solid wastes generated in the zones that were privatised (Ndeto, 2009). In Buenos Aires, Argentina, collection of solid waste is by private firms. These are also tasked with the operation of solid wastes transfer stations and sanitary landfills. Their relationship with the government is through contract with the government. In addition, one of the largest landfills is managed by a private organization (UNEP, 2005).

Koppenjan and Enserink (2009) in their article, “Public–Private Partnerships in Urban Infrastructures: Reconciling Private Sector Participation and Sustainability”, argue that partnerships between the government and the private sector may lead to over engineered solid waste management structures being constructed. These may also be inefficient and if unchecked, may result in the long term unsustainable debts, high charges for use of solid waste management services and in extreme cases result in contract renegotiations favouring the private sector and eroding the public good (Koppenjan & Enserink, 2009). There are however no cases given where alternative financing mechanisms for solid waste management have failed. Possible failure cannot be dismissed because these are relatively new approaches and just like any new initiatives, it may take a while before their failure is evidenced.

2.7 Gaps in the Literature Review

There is paucity of available literature on alternative financing mechanisms for Solid Waste Management applicable in Kenya especially in view of the devolved form of government where different regions will be governed by different county governments. These county governments will be in charge of financing SWM in their areas of governance. The importance of alternative financing mechanisms for SWM to counties in Kenya cannot be underestimated. However, despite its importance, no one has collected specific data for its study. There is also very limited information on alternative financing mechanisms and studies on suitability of the different microfinance institutions and the role they could play in SWM.

2.8 An Overview of the Literature

The above literature has shown that alternative financing mechanisms for solid waste management can provide solutions to SWM financing woes. They may offer a lifeline for both national and county authorities to improve their SWM functions, which may in turn affect positively on the environment. This may result in environmental sustainability and improved health for their residents. The importance of financing in SWM cannot be underestimated; neither can the need for alternative financing mechanisms to augment traditional sources of financing, such as grants and government finances, in SWM.

The purpose of the literature above is to highlight solid waste management practices that are used in different places in Kenya. The literature seeks to identify gaps that other exist in previous research. The information in the above literature review will be applied in Kajiado County of Kenya’s case to compare the financing mechanisms in place in Kajiado with trends

around the globe. The information will further be used to propose alternative financing mechanisms that are applicable to the unique situation of Kajiado County of Kenya and other Counties in Kenya. An analysis of what has worked and what has not will be important to the overall development of alternative financing mechanisms for SWM in Kajiado County of Kenya.

2.9 Conceptual Framework

SWM is a challenge in Kajiado County of Kenya just as it is a challenge in many town councils and municipalities in most developing countries. This is largely because of insufficient financing and inadequate appreciation of its importance. Globally, governments face increased expenditure requirements despite diminishing tax revenue sources. As such, government officials are inclined to deny SWM projects financing because of much pressing needs in areas such as education, health and security. Strategies for highlighting SWM are as a result not given sufficient attention. Inadequate access to finance and total reliance on governments to finance SWM projects must be addressed as a matter of urgency.

It is in regard of the above issues that the cost of SWM can be minimized by utilizing alternative financing mechanism within SWM sector and its promotion as a concept for improving the health standards and environmental friendly approaches for managing wastes emerged. One of the objectives for achieving this goal is to improve access to finance for the sanitation sector with a bias towards SWM. This concept promotes affordable and appropriate technologies in different Counties in Kenya. The independent variables that seek to achieve this objective are alternative financing mechanisms, which are expected to directly affect, and/or increase access to finances for the enhancement of SWM sector/activities. Thus, increase in access to finance will result in minimization of the cost of SWM. Other control variables include; institutional issues and environmental sustainability, which are direct but independent consequences of SWM.

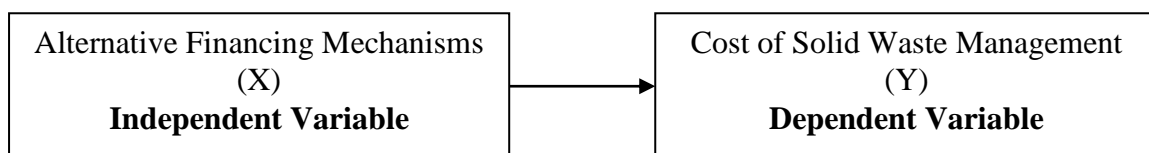


Figure 2.1: Conceptual framework

Independent variable:

- ✓ Alternative financing mechanisms in Kajiado County of Kenya

Dependent variable:

- ✓ Cost of solid waste management in Kajiado County of Kenya

X = Alternative financing mechanisms

Y = Costs of Solid Waste Management (This include cost of transportation, landfills, equipment and machinery, salaries and wages)

Cost of solid waste management = a + b Alternative Financing + Other factors

$$Y = a + bX + \varepsilon$$



CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This section analyzes the various methods that were used for data collection and subsequent analyses. The section also contains a discussion on the strategies that were used to ensure the validity, objectivity, reliability, and integrity of the data used.

3.2 Research Design

Research design refers to a strategy used by the researcher in collecting and analyzing data in order to test the research hypothesis or answer the research questions. Research design is the ultimate blueprint for the collection, measurement and analysis of data (Kothari, 2004). A research design is an arrangement of conditions for collection and analysis of data in a way that combines their relationship with the purpose of research to the economy of procedures (Chandran, 2004). According to Chandran (2004) research design can either be experimental or non-experimental. Under experimental, there are two types namely after only and before and after design, while in non-experimental there are descriptive, historical, observation and surveys.

According to Bryman (2001), there are three main types of study designs, these are: exploratory, causal and descriptive/diagnostic study designs. Bryman (2001) explains that the main emphasis of exploratory studies is to provide familiarity of new insights and discovery of new ideas to the researcher. Exploratory study designs formulate a study for a more precise investigation and are particularly useful when a researcher lacks a clear idea of the problems they will meet during the study (Chandran, 2004). Causal research studies are also known as hypothesis-testing or experimental studies and involve testing hypotheses for causal relationships between variables. These experimental studies require procedures that will not only reduce bias and increase reliability, but will permit drawing inferences about causality.

In essence causality studies deal with cause and effects of the problems (Mugenda & Mugenda, 2003). Descriptive studies on the other hand are concerned with describing the characteristics of a particular individual or of a group. They answer questions of who, what, when, where and how in a given topic (Creswell, 2012). Descriptive studies lead to a profile development of a situation or a group of people by acquiring complete and possible accurate information. Diagnostic studies which share common characteristics with descriptive designs

are concerned with discovering and testing whether certain variables are associated. According to Creswell (2012), a descriptive research reports the way circumstances are, by describing elements such as possible behaviour, attitudes, values and characteristics. Descriptive data is collected through questionnaire survey, interviews and observations (Creswell, 2009). This study applied the use of both qualitative and quantitative approaches. Case study survey methodology was used. Both primary and secondary data were collected. The use of both sets of data was important to enhance the reliability of the information derived. The data collected was presented in the form of tables, bar graphs and frequency tables. Regression analysis was used to analyze the findings. The research design was selected to ensure that all the available data, both qualitative and quantitative was used in generating results for the study (Creswell, 2013).

3.3 Sample Size and Procedure

According to Mugenda and Mugenda (2003) a sample is a small group obtained from the accessible population in which a member is referred to as a subject, respondent or interviewee. The basic idea of sampling is that by selecting some of the elements in a population we may draw conclusions about the entire population (Creswell, 2009). Sampling design is a definite plan determined before any data are actually conveyed for obtaining a sample for a given population (Creswell, 2009). Cooper and Schindler (2006) added that the basic idea of sampling is that by selecting some of the elements in a population one can make conclusions about the entire population.

Sekaran (2000) agreed with this view, stating that by studying the sample, and understanding the characteristics of the sample, it would be possible to generalize the properties or characteristics of the population elements. The sample will be preferred to the entire population because of cost, time constraints, greater accuracy of results and faster speed of data collection as it is not possible to access every other shop from the theoretical population (Cooper & Schindler, 2006). This study focused solely on SWM in Kenya and particularly in Kajiado County of Kenya. Well established Micro- Finance institutions such as K-Rep, Equity and Kenya Women Finance Trust (KWFT) were approached to establish the kind of support they required to fund solid waste management projects in Kajiado County of Kenya and in other counties in Kenya.

The survey sample was made up of 13 employees from Olkejuado County Council and an additional 13 employees from Kajiado Town Council. They consisted of 10 solid waste management staff, 3 senior financial department staff with at least one staff involved in budgeting and the overall head of each of the county councils. Others who were surveyed include officials from some of the microfinance institutions with offices in Kajiado, environmental ministry officials working in the area and officials of NGOs involved in SWM working in the area. These respondents were considered to be best placed in giving a true picture of topic under study. Random sampling was utilized in selecting households' representatives from each segment to obtain a representative sample.

According to Beri (2010), multi-stage sampling encompasses the selection of units in many stages. In this case, the sampling technique aimed at obtaining the views of different stakeholders involved in solid waste management in Kajiado County of Kenya (Beri, 2010). The sample size is representative of all the major stakeholders involved in solid waste management within the county of Kajiado. This sampling was selected to ensure that all the major players in solid waste management were incorporated in the study. The sampling took into consideration the population of Kajiado County of Kenya, the dispersion of all the people involved in solid waste management and the landscape of Kajiado County of Kenya. The sample was also designed to minimize data collection costs.

3.4 Population

The studied population was made up of persons from all divisions that contribute to SWM within Kajiado County of Kenya. Specifically; the two Kajiado County council authorities, health officials and professionals, businesses engaged in food and food processing services, as well as an array of households both high income and low income categories in the county, NGOs and special organizations e.g. CBO's engaged in supporting SWM. The questionnaires were distributed in Ngong, Ongata Rongai, Kitengela and Isinya. The sample population that was surveyed was two hundred and five (205) respondents. This was derived from the different groups identified above.

Twenty six (26) from the two municipal councils within Kajiado County of Kenya, fifteen (15) health professionals from different health institutions within the county, four (4) representatives of some of the organizations involved in solid waste management in the county while one hundred and sixty (160), general residents of the county derived from forty

(40) households within the area. To achieve the targeted population, the study area was divided into three segments. According to the Kenya national bureau of statistics (2009) Kajiado County of Kenya, had a population of 686,992 people who reside permanently within the county. Considering the cost and population size necessary to generate sufficient results for the study and financial limitations, the population selected was reasonably small. However, it was essential to ensure that the population was large enough to be effective and to deliver the required results.

3.5 Data Collection Tools

The instruments that were used for data collection were questionnaires which were administered to the sample population. The questions were structured both as open and close ended. The open-ended questions enabled the respondent to clarify issues further that provided an in-depth finding for this study. The close ended questions enabled the researcher to obtain background information on respondents involved in SWM. The advantage of this method is that it is the most feasible and allows the respondents moments of reflection on the subject. This is because it is cost effective, free from bias and gives the respondent adequate time to respond to the questions (Creswell, 2012). The study therefore used both secondary and primary data. According to Creswell (2012), primary data are those which are collected afresh and for the first time and thus happen to be original in character. Secondary data on the other hand are those which have been collected by someone else and which have already passed through a statistical process.

There are various data collection methods that can be used among these are; observation, interviews, questionnaires, data schedules among others. Primary data was collected through structured and semi- structured questionnaires. Oral interviews were administered to the employees of Olkejuado County Council and Kajiado Town Council; the two county councils in Kajiado County of Kenya. The focus was on staff involved directly in SWM, finance staff in charge of budgets, capital expenditure and operational and the overall management of the two County Councils. Informal interviews were also carried out to augment the results of the survey. Only trained personnel administered the questionnaires (Babbie, 2008). Oral interviews were also used to obtain information from key stakeholders such as government officials, selected and willing small-scale players in Kajiado solid waste sector and current financiers of these private SWM activities. These interviews collected views and opinions of those involved in regulation, administration, manufacture, and sale of SWM equipment and

major solid waste components such as plastic containers and wrappers in Kajiado. They involved open discussions with the respondent to allow more weight to be assigned to issues that the respondents felt were relevant within the scope of study (Babbie, 2008).

Secondary data was collected from publications by credible institutions such as the Government of Kenya, World Bank and the UNEP, journals and books on the subject of alternative financing mechanisms in developing countries. Information from both primary and secondary sources was compared for accuracy and consistency (Kothari, 2004). Case study site visits were conducted on the solid waste collection centres and dumping sites within Kajiado County of Kenya. The data collection tools were selected due to their efficiency, effectiveness and minimal financial costs. The questionnaires were instrumental in collecting data directly from the study sample. Oral interviews were useful in collecting unstructured information while secondary data helped corroborate the collected information with studies from other researchers.

3.6 Research Quality –Validity, Reliability and Objectivity of the Research

All individuals involved in data collection were thoroughly trained prior to commencement of the data collection process. This was done in order to avoid biases that would affect the reliability and validity of the data collected. To maintain objectivity, the interviewees' personal information were not collected or recorded. All interviewees participated freely (Saunders, Lewis, & Thornhill, 2009). Validity and reliability are important components of the research process and have to be ensured through the adoption of the correct procedures in administering the instruments. According to Mugenda and Mugenda (2003), in a research study, the reliability co-efficient can be computed to indicate how reliable data are. A coefficient of 0.80 or more implies that there is a high degree of data reliability. Sometimes, a researcher may get away with using less reliable data if the sample is very big or the variables under study differ or vary greatly among the subjects.

But where the sample size and variations among the subjects are small, a highly reliable data set is required to reveal the magnitude of these variations. In this study, during the questionnaire's construction, quality control and validity were ensured through face validity and construct validity. In face validity, the instrument was subjected to a critical review to check whether it has measured what it was intended to measure. Construct validity was maintained through restricting the questions to the conceptualization of the variables and

ensuring that the indicators of a particular variable falls within the same construct. To test for reliability and validity, the information obtained from the research was compared with information obtained from other researches for consistency. It also enabled this study to derive much more accurate findings and thus increase its contribution to the solid waste management body of knowledge (Saunders, Lewis, & Thornhill, 2009).



CHAPTER 4: PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This chapter presents the findings of the research. The analyses first profiles the data using descriptive statistics then uses inferential statistics relying principally on regression analysis.

4.1.1 Data Analysis

Qualitative and quantitative data analysis approaches were used. Qualitative approaches include analysis of non-quantifiable situational factors and sentiments conveyed by other authors and solid waste management stakeholders in Kajiado County of Kenya.

This thesis used both statistical analysis and qualitative studies to explore the impact that alternative financing mechanisms in Kajiado County have on minimizing costs of SWM. Regression analysis was used to identify possible relationships between the alternative financing and minimizing of costs for solid waste and identified dependent variables- costs of SWM (where costs include; cost of transportation, salaries of staff, machinery and equipment, cost of landfills) and the independent variables as alternative financing mechanisms. The study utilized compiled estimated costs for twelve years from the year 2003 to 2014. Interviews and secondary sources examined local ,political, economic, and historical factors that affect costs and financing of SWM.

This thesis tested that alternative financing mechanisms would have a contribution to the reduction of the costs of managing solid waste. The hypothesis for minimizations of costs through use of alternative financing mechanisms asserts that alternative sources will benefit the SWM.

To evaluate this hypothesis, it must first be shown that the costs of managing solid waste have been increasing over the years and the contribution of finances from the traditional sources does not match the costs.

Complementing regression analysis with these interviews and other data sources provides a fuller picture of alternative sources available, mechanisms present and its impact on the reduction of costs for SWM. Statistical analysis will establish, if any, a relationship between alternative financing and minimization of costs for SWM. The other sources used for

qualitative purposes will provide a more in-depth look at how alternative financing sources impact or are impacted by local nuanced factors and how they affect the costs and financing of SWM.

4.1.2 The Population of Kajiado County of Kenya

Table 4.1: Kajiado Population

Age	Female	Male	Totals
0-10	101,993	104,612	206,605
10-20	73,480	72,478	145,958
20-30	79,624	69,651	149,275
30-40	42,836	48,602	91,438
40-50	21,973	26,090	48,063
50-60	10,461	12,621	23,082
60-70	5,763	6,021	11,784
70-80	3,162	2,968	6,130
80+	2,718	1,939	4,657
Totals	342,010	344,982	686,992

The population of any location is important when analysing effects of solid waste and solid waste management, it helps determine the amount of solid waste generated and the diversification of the type of solid waste to be generated. An increase in population within any county or region results to an increase in solid waste generated and all the challenges that come with it. Waste production in Kajiado County of Kenya currently stands at 1,500 tons per day. Given the considerably high waste production, solid waste management needs adequate financing to ensure that the environment is habitable (Karani & Mutunga, 2008).

According to the Kenya national bureau of statistics, Kajiado County of Kenya, as at 2009, had a population of 686,992 people who reside permanently. Animal agriculture being a major economic activity within Kajiado County of Kenya, substantial amounts of solid waste is also generated from animals (Kajiado pop Pyramid Age Groups, 2009). From the above table, it is clear that the highest population amongst the people of Kajiado is of age group 0-10. These are also the most vulnerable in case of poor solid waste management in any society. As shown below the per capita expenditures within Kajiado County of Kenya has increased with an increase in population between the years 2008/2009 and 2009/2010.

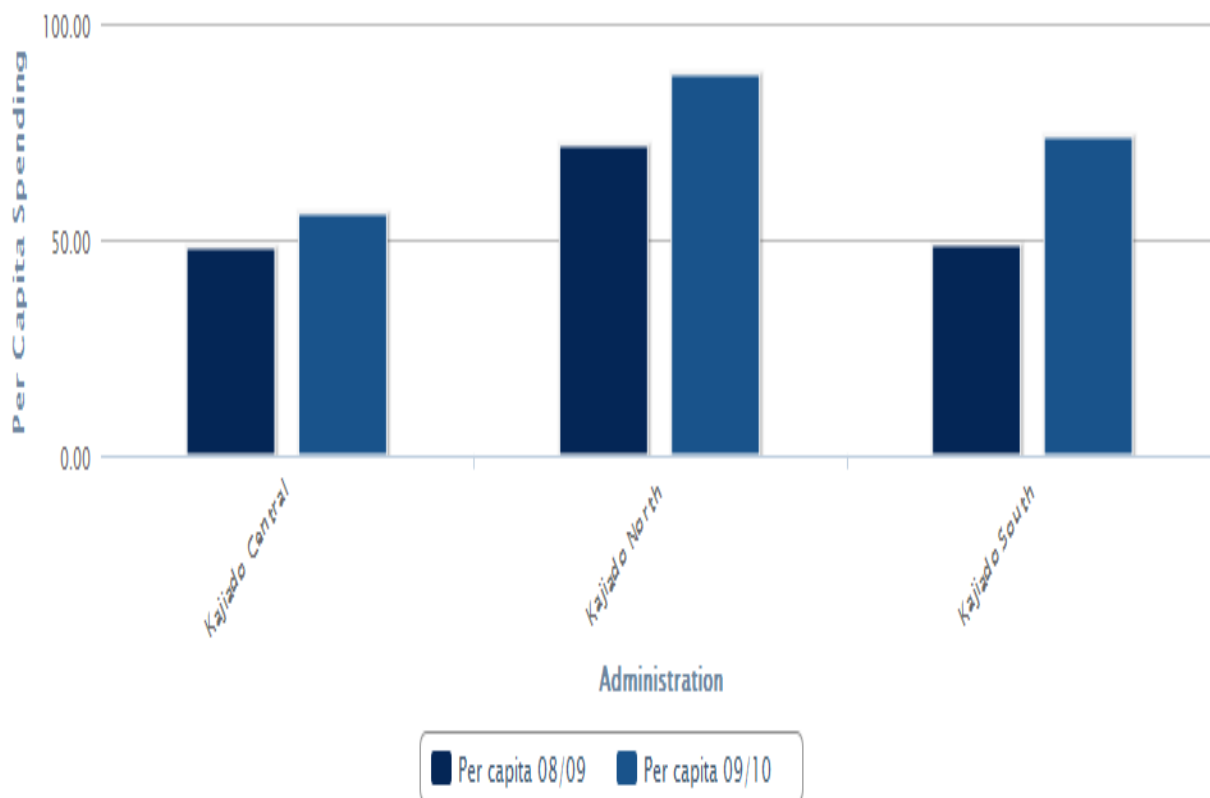


Figure 4.1: Per Capita County Expenditures (Kajiado)

Source: (Kajiado County, 2011)

4.1.3 Solid Waste Management System

The solid waste composition, is mostly from house related activities; kitchen refuse (e.g. vegetables peelings), pieces of papers, soil, plastic bags, sanitary towels and used pampers, and leaves of ‘chat’. Animal waste also contributes to SWM problems in the town. E-waste is currently not a major problem but it is foreseen especially with the growth of devolved government. The survey report shows that, the administration system for SWM is neither strong nor structurally well-organized. The municipality covers only main business hubs in towns. This is mainly done through government allocations. In other cases, household pay service fee to the specific service providers. Thus, only a small portion of the county solid waste is managed by the municipal.

This shows that in Kajiado County of Kenya, the SWM coverage is minimal. The findings did not establish the per capita waste generation and but found that the Private Sector Participation (PSP) is lacking. From the findings it is safe to infer that the problem of SWM a serious problem. Additionally, capacity inabilities of trained work force to handle SWM issues, (in both quality and quantity) including disposal of solid waste and shortage of

finances are a very serious problem. The survey also cited corruption, poor attitude towards SWM, cultural practices as other challenges affecting SWM in the county.

4.1.4 Improper Disposal of Solid Waste in Ngong Town (Kajiado County of Kenya)

The same survey revealed that, the attempt of the municipality to obtain land for landfills near the users was practically impossible due to the cost (land near towns are more expensive than land distanced further from towns). The land obtained for landfill is too far from the users thus encouraging illegal dumping. This in turn was due to shortage of finance to purchase land in a more accessible area. Hence, until now there are several emerging illegal dumpsites.

4.2 Cost of Solid Waste Management Mechanisms

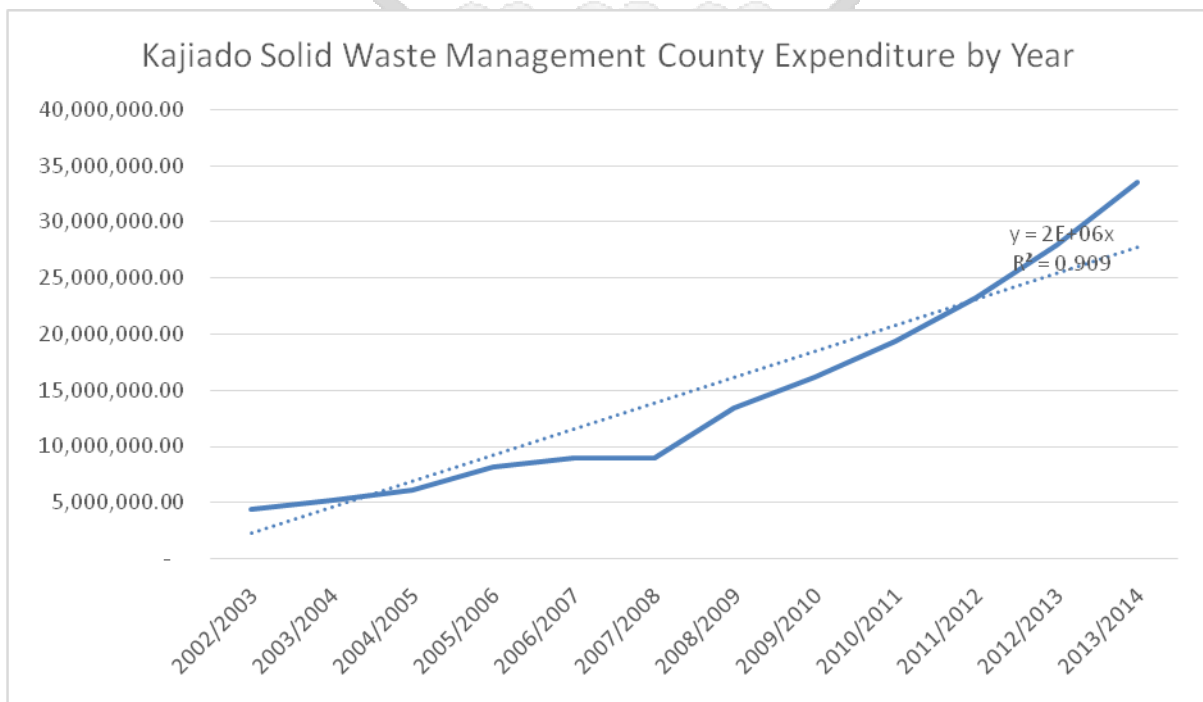


Figure 4.2: Cost of solid waste management in Kajiado County

From the chart above the amount spent by the Kajiado County on solid waste management has been on the rise. The figures above have been derived from the county expenditure figures.

4.3 Regression Analysis

Table 4.2: Regression Results

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.943437311
R Square	0.890073959
Adjusted R Square	0.879081355
Standard Error	6642082.935
Observations	12

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	3.57	3.57	80.97026	4.14
Residual	10	4.41	4.41		
Total	11	4.01			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	451568.0367	3730394.874	0.121051	0.906048
Alternative financing of SWM	3.682632775	0.40925657	8.998347	4.14E-06

$$Y = a + bx$$

Where:

y= costs of SWM (where costs include; cost of transportation, salaries of staff, machinery and equipment, cost of landfills)

a= the constant amount that is provided at any point in time by the government

b= coefficient

x= Alternative Financing Mechanisms (Finances contributed by alternative financing mechanism)

Regression analysis was used to explore statistical relationship between the alternative financing mechanisms and the solid waste management. Both the costs and the contributions from alternative financing were calculated in Kenya shillings. This thesis hypothesized that there is a relationship between alternative financing and minimization of costs for SWM. The amounts contributed by the alternative sources for financing have been consolidated similarly the costs of SWM have been consolidated. The figures used are for 12 years running from

2003 to 2014. The alternative financing methods popular in the two county governments and that were considered for analysis were, Micro Finance, Private sector Participation, outsourcing and leasing of equipment. The costs that have been considered are the cost of transport, landfills, machinery and equipment, salaries and wages. These are the major costs incurred by SWM.

In the analysis

$$\hat{Y} = 451,568.05 + 3.68x$$

H0: Alternative financing minimizes costs of solid waste management

H1: Alternative financing has no impact on minimizing cost of SWM

Regression analysis used to investigate the minimization of costs for SWM using Alternative financing (Adjusted R²=0.87, F= 4.14, P>0.5). The high P value is attributed to the collection of data lumped up for a period of twelve years. From the above, the explained variation is 87% regression shows that there is a possibility that alternative financing mechanism can reduce the costs of SWM expenses. The government contributes a constant amount of at least Kshs. 451, 568 towards SWM in Kajiado and the alternative financing contributes upto 3.68 times towards reducing the costs of SWM expenses. Therefore, from these results, one can conclude that alternative financing minimizes the costs of solid waste though there could be other factors like political, social and economic environments, which could facilitate in the awareness of these alternative methods but are currently not being utilized. From the regression one could deduce that that despite their being a high level of awareness of different alternative approaches to solid waste management, there is little uptake of the same. As such, policy makers should concentrate on building capacity within the councils to be able to pursue these options of guiding organizations to uptake alternative financing methods. This is further supported by figures as shown in appendix D. Thus, more resources should be incurred not on creating awareness of alternative financing mechanisms for solid waste management but in laying down structures to actually obtain financing from alternative sources for enhanced SWM for a cleaner and environment friendly society.

Similar studies were carried out in Latin America where regression analysis was used in three case studies carried out in Aguas Argentina (AASA) a privatized water utility in Buenos Aires, Argentina; Companhia de Saneamento Basico do Estado de São Paulo (SABESP) a

state owned utility in São Paulo, Brazil; and Cooperativa de Servicios Públicos Santa Cruz (SAGUAPAC) water cooperative in Santa Cruz, Bolivia on three specific alternative models of financing water and sanitation i.e. private participation, public participation and decentralization respectively. Regression analysis results showed significant relationship between water coverage and unit operational costs and no significant relationship between water production and non-revenue water. From the regression with (adjusted $R^2 = 0.094$, $F = 2.245$, $p < .05$) the study concluded that there is the possibility that at some modes of financing can impact costs of water coverage. Regression analysis also showed that broad claims about ownership, efficiency, and improved water coverage should be suspect. Not one ownership model established significant relationship between water coverage (SWM cost) and the independent variables (Mode of financing). (Chad Stutsman, 2015).

Therefore a broad conclusion about different models of alternative financing cannot be drawn. Success and failure are impacted by more nuanced historical, economic, political, geographical, and social factors.

4.4 Existing Mechanisms for Financing Solid Waste Management in Kajiado County and their Existing Challenges

Solid Waste Management is a day-to-day operation. The handling and discarding of waste is a very expensive affair. In India, the rate for each ton of solid waste management is \$25-\$30. This does not include the prices of land (Appasamy & Nellyat, 2007). The population of Kajiado, which currently stands at 686,992, would produce approximately 400 tons of solid waste per day. This would translate to a daily cost of \$10,000-\$12,000 that is very expensive. Collection costs account for between 50 to 70 percent of the solid waste management costs. The remaining 50 percent covers tasks such as sorting and treatment (Cost-Saving Ideas: Evaluating Solid Waste Collection Options, 1999). Two variables that in turn increase collection costs are the time it takes to collect solid wastes and the number of vehicles required for collection. Another major determinant of solid waste management costs is the number of vehicles required for solid waste collection. Other costs to be considered in solid waste management include treatment costs that are typically 30 to 50 percent of the total solid waste management costs.

In addition to this, if the waste is recycled, recycling costs may be recovered through the returns from sale of the recycled products. Generally, in Kajiado County of Kenya SWM faces wide ranges of problems. SWM practice in Kajiado County is a serious problem.

Generally, this shows that the attention given by both the community and the government for SWM in Kajiado County of Kenya is still minimal and this is due to shortage of financial capacity to invest to improve the SWM facilities. From the analysis of the responses, laxity of council staff, corruption, insufficient allocation from the government, lack of necessary equipment, poor attitude towards SWM and cultural practices are some of the major challenges associated with SWM within Kajiado County of Kenya.

4.4.1 Self-Financing Option for Solid Waste Management

Self-financing refers to appropriate financing mechanisms that respond to people's needs and willingness to pay that can be selected without requiring any external financing.

4.4.2 Cost Recovery through Service Charges as a Form of Self-Financing

In Kajiado County of Kenya, according to the survey, there is a standard fee charged for solid waste collection, which is between Kshs. 100 - Kshs. 200 per household per month irrespective of the amount of waste generated. There is currently no system of measuring the tonnes waste generated neither by the households nor by commercial businesses within Kajiado County of Kenya. There is though a general dissatisfaction of the standard fee charged for waste collection. Some household feel that it should be charged based on waste generated. The user fee charged does not cover the costs of investing in SWM it only covers garbage collection.

4.4.3 Micro-Credit and/or Fund Financing (MFI's)

Micro-credits and Micro Finance Institutions can be important tools for financing SWM services in Kajiado County of Kenya especially in the poor settlements. In Kajiado, the county council of Olkejuado recently advertised for independent contractors to partake in the collection of garbage from different mapped out zones for a price. The council intends to service the tenders using the amount it sets aside for garbage collection in its annual budget. These amounts are shown in Figure 4.3.

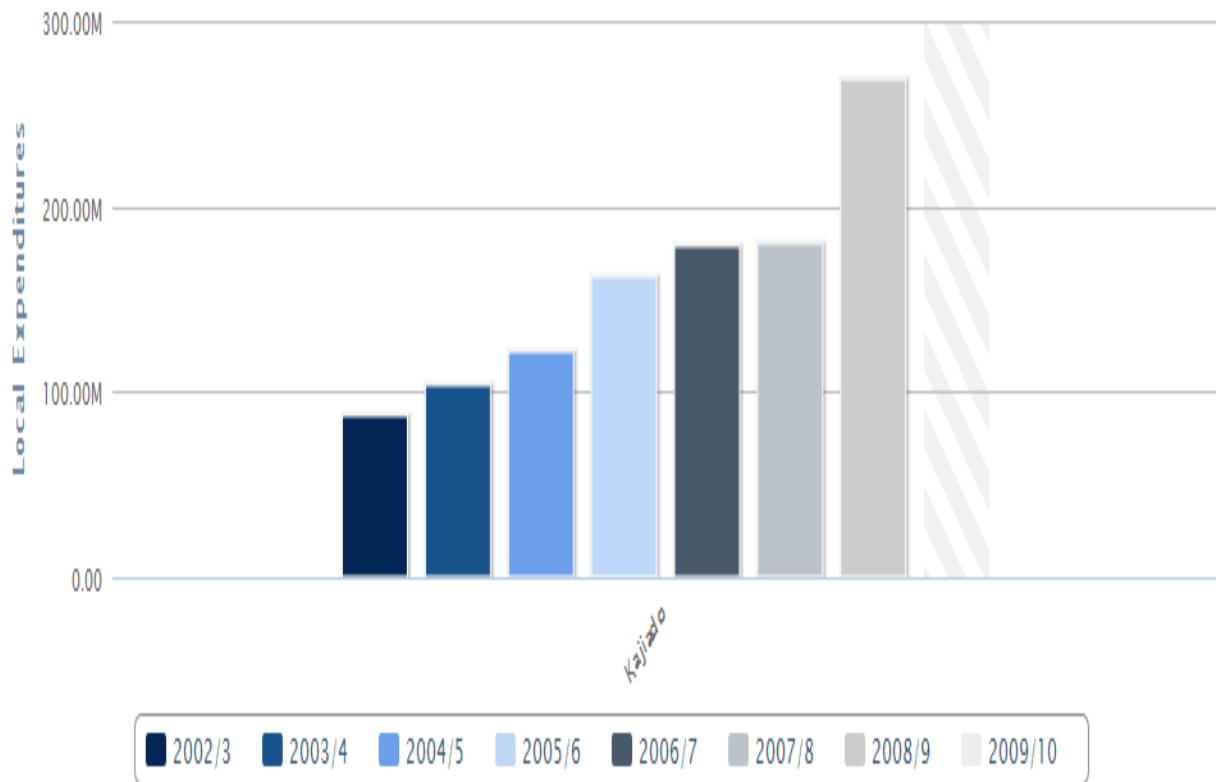


Figure 4.3: Local Authority Expenditures by Year (Kajiado)

Source: (Kajiado, 2011 Solid waste management expenditure in Kajiado)

Approximately 5% of these expenditures go towards solid waste management. Only about 30% of the amounts set aside for solid waste management go towards administrative costs, with the remaining 65% going towards remunerating private collection companies such. These subsequently became revenues for these companies. The table below shows the amount of county expenditure that goes towards solid waste management and subsequently, that is paid out to private solid waste management collectors.

4.5 Potential for Implementing Alternative Financing Systems for Financing SWM in Kajiado County of Kenya

According to the findings, a proposed workable financing to be implemented by MFIs (for example Micro finance; Equity and Kenya Women finance trust) includes: Issue of loans through government backing to SWM projects. Especially for those projects which involve recycling and waste to Energy projects like biogas, Private sector participation, CDF through allocation of CDF money towards SWM and Community Based Organizations. The proposed financing should cater for the expenditures not met and the costs of improving the SWM

sector in the county. Like capital investments on a proper SWM infrastructure etc. better ways of decomposing waste, up to date trucks for collecting waste to facilitate for separation of waste at source.

4.5.1 Small and Micro Enterprises in Solid Waste Service Provision

Table 4.3: Inter –Group Comparisons: Composting Income Generated

Composting Group	Number of Members	Date Started	Profits from Composting (Ksh) (as of April 1995)
Hawkers Market	15	October 1994	36,000
Kinyago	27	July 1994	3000
Korogocho	20	June 1993	18,000 to 20,000
Dandora	13	May 1992	n/a*
Dagoretti Corner	12	September 1994	1500
Kayaba	24	July 1993	1732
Kibera	15	1994	n/a*

Source: (Peters, 1998)



Infrastructure delivery and management provides a major opportunity to develop small and micro-enterprises in SWM services. It is necessary to develop specific simplified contracts for small contractors and micro-enterprises to enable them to compete (UNCHS Habitat, 2005). Comparisons with other small and micro enterprises within other parts of the country as shown in the above table show that small and micro enterprises in Kajiado County of Kenya is a viable option of financing and enhancing SWM.

4.5.2 Private Sector Participation/Public Private Partnerships

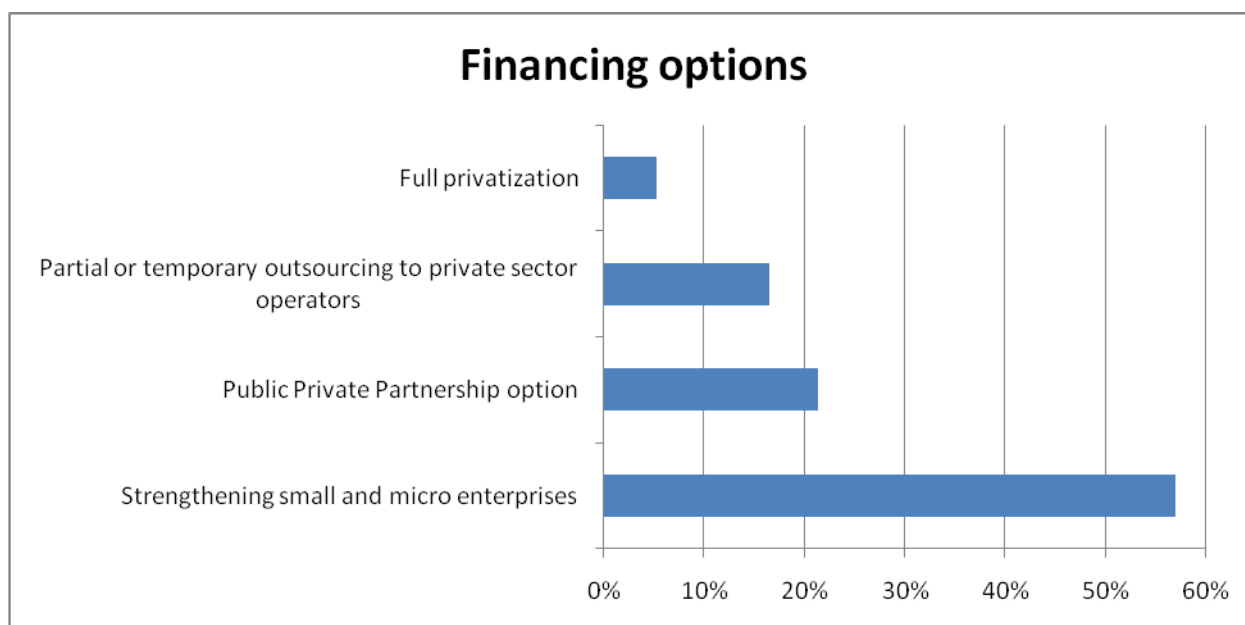


Figure 4.4: Respondents financing options

From the findings, the results show that about 56.5% of the service users were interested in strengthening small and micro enterprises. While about 21% support Public Private Partnership option, 16% partial or temporary outsourcing to private sector operators and 5 % full privatization. The findings also show that the majority of respondents at 57% view small and micro enterprises as a sustainable financing option, while about 21% prefer Public Private Partnership. The probable limitation of this option is that, the private sector is mostly focused on quick returns on investments; this might not be sustainable in the SWM sector. The overall performance and results of the SWM is slow.

Revenue to private solid waste management contractors (@65%)

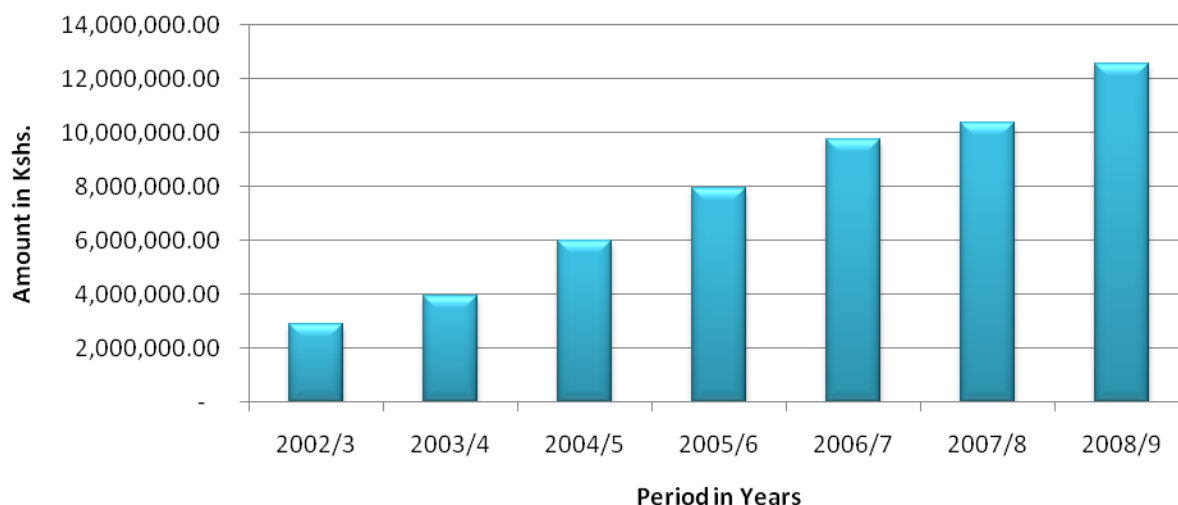


Figure 4.5: Solid waste management revenue to private institutions

Solid waste management's spending has been increasing in Kajiado County of Kenya. This provides an opportunity for private investors. The chart above shows the expected revenues from the sub contracting of solid waste management to private investors by the two counties within Kajiado. As is evident, the revenues available to private participants in the field of solid waste management have been increasing.

The Community Development Fund (CDF) could also be used as it has so far not been utilised in financing SWM. The government introduced the CDF in order to facilitate the improvements of projects that need financial support. SWM is certainly a spot where CDF could participate. Given the example of the Indian city of Ahmedabad, where in mid 1990's CDF was used to finance SWM and upgrade SWM equipment, CDF can be combined with viable public private partnership options in Kajiado County of Kenya. This will create an increased base of financial resources for the management of solid waste.

4.5.3 Privatization Modes Contracts

Table 4.4: Public Private Partnership and Privatization Contract Modes

Option	Asset Ownership	Ownership and Management	Financing /Investment	Commercial Risk	Duration	Advantages	Disadvantages
Service Contract	Public	Private	Public	Public	1 -2 years	Payment to the contractors are linked to work performed	Unlikely to improve performance greatly where overall management is weak
Management Contract	Public	Private	Public	Public	3-5 years	Gains managerial efficiency	Difficult to enforce and the county remains responsible for investment
Lease Contract	Public	Private	Public	Shared	10 - 15 Years	Commercial risks borne by private sector gives strong performance incentives	Government remains responsible for investment
Outsourcing	Private	Private	Private	Private	Indefinite	Has potential to high efficiency and gains	Requires credible regulatory framework

The main modes of privatization options for Kajiado County of Kenya, advantages and drawbacks are briefly discussed below.

4.5.3.1 Service Contract

The Olekajiado Municipal Council and Kajiado Town Council pay a fee to a private firm to provide specific operational services such as, garbage collection, and operating facilities. This means specific tasks are contracted to the private sector, but overall utility management remains with the public sector. The typical duration for this type of contract is usually from 1-3 years. Mexico City is a classic example whereby the municipal has divided the city into four zones, each allocated to a private service contractor for 10 years, beginning from 1993 (Djerrari, & Ghariani; World Bank, 2004). In Kajiado County of Kenya, service contracts could be possible in the areas of garbage collection where the local municipality owns the trucks and the like.

4.5.3.2 Management Contract

A management contract places a municipal service under private management for a specified period, for which a private company is paid a fee to operate a set of municipal services with a typical duration of 3-5 years. Olekajiado Municipal Council and Kajiado Town Council pay a fee to a private firm to assume overall responsibility for operation and maintenance of a service delivery system (e.g., SWM public toilets, etc.), with the freedom to make day-to-day management decisions in their area of responsibility. The success experience of management contracting practice in SWM was cited from Caracas, Seoul, Bangkok, Jakarta, and Lagos. Cost savings can be significant, for example in US—private sector is 10-30% cheaper, in UK and Canada—private sector is 20-40% cheaper) (UN Habitat, 2005). If this mode of PSP is implemented in Kajiado County of Kenya, in the areas of SWM administrations it can solve the management inefficiency problems in relation to cost saving, operation and maintenance.

4.5.3.3 Lease Contract

A private company rents facilities (for example, a garbage dumping site) from the municipality and assumes responsibility for operation and maintenance or a private company leases the assets of a utility, and maintains and operates them, in return for the right to revenues within a typical duration of 10 to 15 years. For example, Water in Guinea; Guinea instituted a lease contract for water supply in Konakry and 16 other towns in 1989. The benefits included a substantial increase in access to potable water, increased connections, and

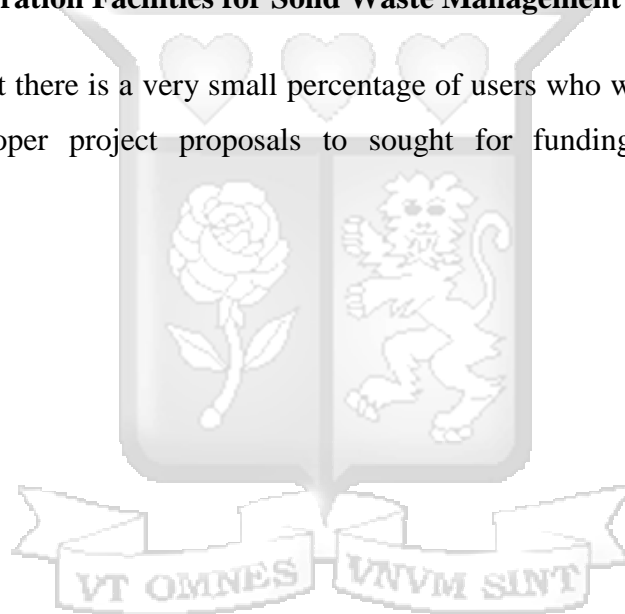
progression to full cost recovery. In Kajiado County of Kenya, if the local municipality arranges a lease contract for garbage collection by owning its own trucks and dumping site, it can help in SWM problems in the county.

4.5.3.4 Full Privatization or Outsourcing

In full privatization, The Olekajiado Municipal Council and Kajiado Town Council sells off an asset to a private sector firm and has no further involvement with it. The typical duration is indefinite, but may be limited by a license. The advantage of this option is its potential for high efficiency gains, while the drawback is that it requires credible regulatory framework (UNCHS Habitat, 2005).

4.5.3.5 Project Preparation Facilities for Solid Waste Management

The survey shows that there is a very small percentage of users who would like to utilise the skills of writing proper project proposals to sought for funding for SWM projects.



CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this section, this study provides a discussion on the findings of the research as compared to the findings in the literature review. The conclusion and recommendations offer a platform for further improvement on identifying the measures to be taken to attract wide interest in open innovation and enrichment in the academic field.

5.2 Conclusion

Solid Waste Management matters. And how to source for finances matter just as much. There have been numerous examples from other countries which have applied different alternative financing sources to fund the costs of SWM and succeeded. The application of use of alternative financing sources for the SWM sector is important. For example, In Buenos Aires, Argentina the use of private sector participation is widely used. In São Paulo, Brazil SABESP's public sector participation is used; in the Philippines municipal bonds for funding SWM is used. This thesis sought to investigate the impact that alternative financing sources had on minimizing the costs of managing solid waste.

Two levels of analysis were used. First, a statistical analysis using costs over a period of twelve years and finances received from alternative sources for the same period. Both the costs and funds received were lumped up because it was not possible to get individual contributions from the records and second qualitative discussions.

Regression analysis was used to identify significance between alternative financing and the impact on the minimization of costs for SWM. Integrating with the data analysis a comparative study of responses was used to explore the impact of using different alternative mechanisms for minimizing costs of SWM. It was discovered that historical, political, and economic factors significantly affect the management of solid waste.

Regression analysis showed that there is the possibility that funds from alternative financing sources reduce the costs of managing solid waste and thus improve SWM sector. Some alternative financing mechanisms from the discussion are more accessible since they are

being practiced at a minimum level for example private sector participation amongst households. For the municipal councils currently handling SWM, involvement of other financial sectors can translate into improved SWM.

Not one alternative mechanism has been established but several to identify which is most effective in the county. However, responses from different participants showed that historical, political, economic, and institutions affect the SWM sector. SWM is complex.

Does increased access to funds imply effective management of SWM? Not really. This thesis did expect to see that contributions from alternative financing sources impacts on the minimization of the costs of managing solid waste. Statistical analysis coupled with qualitative studies has concluded that this could be true holding political, social and cultural factors at ceteris paribus.

This study does not draw a broad conclusion about which mechanism to use. Success and failure are also impacted by more nuanced historical, economic, political, geographical, and social factors.

5.2.1 Costs of Solid Waste Management Mechanisms

Kajiado County of Kenya like other satellite regions surrounding Nairobi, the capital city of Kenya, is rapidly growing. This is because of an ever-increasing population within and around the city. The heavy investment in infrastructure over the past decade has also resulted in the opening up of areas that were previously inaccessible. As such, the population of Kajiado is expected to grow exponentially over the short to long term. A growth in the population brings with it solid waste management issues. Enhanced solid waste management will require additional funding and thus the need for alternative approaches to meet these funding needs.

Solid waste management costs in Kajiado County have been increasing steadily since 2002 to 2009. This is because of a steady rise in the population of Kajiado County. In the future, the county will have to plan for its solid waste management needs. This includes setting aside increased budgetary allocations to cater for SWM, investing in new technologies for SWM and investing in communities' sensitization to fight SWM. To achieve this, Kajiado County management needs to supplement its public finances with alternative financing mechanisms to meet the goal of an environmentally clean Kajiado County.

It is important for authorities in developing nations to source for alternative financing approaches to finance solid waste management. This is in light of high budgetary pressures on government finances limiting the amounts available for solid waste management. This is important, as it will create opportunities for solid waste management while at the same time leading into the sustainable growth of enterprises that will lead to increased social developments. Alternative financing mechanisms for solid waste management are thus an important component of solid waste management especially in developing countries.

5.2.2 Existing mechanisms for financing Solid Waste Management in Kajiado County and their Challenges

The results of the analysis point to a deficient solid waste management function in the larger Kajiado County of Kenya. The respondents were quick to point out that the level of solid waste management in the county was deficient and devoid of their expectations. These residents also pointed out that the councils in the County were inadequately equipped. This can be directly attributed to a low level of financing for solid waste management. As such, additional financing is important to advance the solid waste management function. The main challenge in SWM in Kajiado County is the lack of sufficient funds. Budgetary allocations from the national and county government are hardly sufficient to cover SWM costs. As such, county managers have to come up with alternative financing mechanisms to fill this financing gap. Alternative finances can come from non-governmental organizations, donor governments, residents' contributions and even micro finance loans.

5.2.3 Potential for Implementing Alternative Financing Systems for Financing Solid Waste Management in Kajiado County

One of the financing options that the respondents favoured most was microfinance financing. Others that were mentioned included public private partnerships, non-government institutions contributions and increased financing from the government and the local councils. Microfinance institutions have the ability of funding small and medium sized institutions engaged in solid waste management. As such, they are most likely to have the most impact as they empower people to be in charge of their own environmental management and to develop profitable enterprises for solid waste management. Microfinance institutions are in a unique position to stimulate the economy. They can help create sustainable development in the challenging regions that are in developing countries. This is because of their ability to create targeted financing instruments resulting in socio economic transformation within developing

nations. Given such immense potential, microfinance institutions should be harnessed to develop specialized financing for solid waste management (Lal & Meyer, 2012).

Regulatory bodies and other authorities in charge of solid waste management in developing nations should device alternative approaches to increase financing to this vital function. Such an approach is important, as it will increase the development of enterprise around solid waste management. This will not only result in a better and cleaner ploy and will increase the level of employment through increasing the number of enterprises. As such, county councils should seek additional financing for these vital functions.

5.3 Recommendations

Kajiado County of Kenya Councils should seek alternative financing mechanisms for financing solid waste management. This involves the incorporation of private sector financing, non-governmental institutions and microfinance institutions. From the findings above, it is obvious that many viable SWM financing options are not being pursued in Kajiado County of Kenya. The county leaders should seek to develop these avenues to enhance solid waste management in the county. More studies should be conducted on how the law can be enforced in SWM within the county. Further studies needs to be carried out on how to solve the plastic bag menace.

5.4 Limitations of the Study

There is currently limited statistical data available on the total costs of SWM therefore the information is based on estimations. Due to political interference and the risk of exposure most of the government officials were unwilling to share the information on the costs and incomes for SWM. In the new system of county governments most offices are still trying to get their bearing and thus difficult to get substantial information most data was incomplete. The households consider SWM a responsibility of the government thus very few are willing to uptake the initiative of financing solid waste

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APPENDICES

Appendix A: List of Organizations

National Environmental Management Authority (NEMA)

Nairobi County Council

Nairobi City Council

Olkejuado County Council

Kajiado Town Council

K-Rep Bank

Equity Bank

Kenya Women Finance Trust (KWFT)

Ministry of Environment and Mineral Resources



Appendix B: Letter of Introduction

STRATHMORE UNIVERSITY

[Date]

[Addressee]

[Company name]

[Company address]

Dear Sir/Madam,

REF: RESEARCH ON ALTERNATIVE FINANCING MECHANISMS FOR SOLID WASTE MANAGEMENT

I am a postgraduate student at Strathmore University pursuing a Master of Commerce degree. I am carrying out a research on the alternative financing mechanisms for Solid Waste Management in Kajiado County of Kenya.

Your organization is among the organizations selected for this study. I am requesting that you complete the attached brief questionnaire. The process should take about 10 minutes of your time. Please note that participation in this study is voluntary and all information received will be treated as confidential.

In case of any question or clarification on this study, please contact me on 0722 499688 or, my university supervisor through *rmudida@strathmore.edu*.

Thanks in advance for your participation in this study.

Yours sincerely,

Enid Sirengo.

Appendix C: Questionnaire

Items in the questionnaire:

Variables	Section	No. of Items	Item Number	Scale
Personal Data		1	1	2
Alternative Financing Mechanisms	A	2	2-4	6
	B	5	5-9	4
	C	4	10-13	4
	D	2	14-15	Open ended

Kindly check the box next to the question or fill in the blank with the appropriate scale for all the items below.

1.0 Personal Data

1) Do you reside in Kajiado County of Kenya?

1. Yes
 2. No

Section A

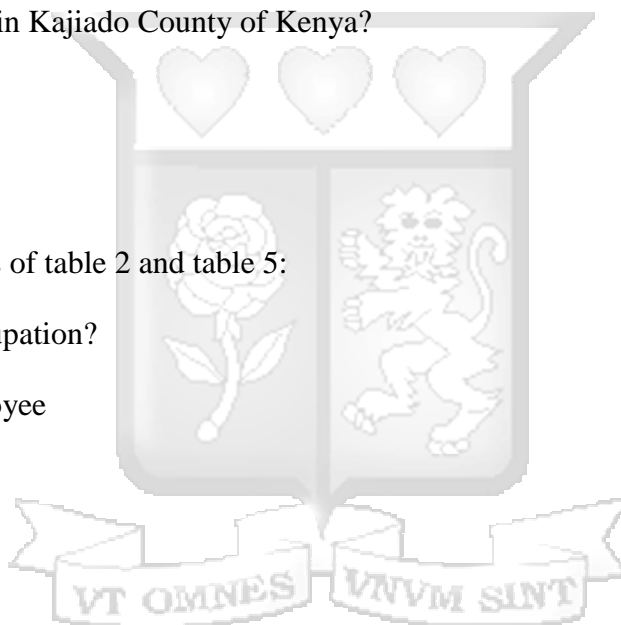
To cater for the results of table 2 and table 5:

2) What is your occupation?

- Government Employee
 Private Employee
 NGO employee
 Business Owners
 Pensioned
 Unemployed

3) In your opinion how would you rate the degree of managing SWM problem within the region

- Good,
 Poor
 Very Poor
 Extremely poor



Section C

On a scale of 1 to 4 indicate the expected level of success of each of the following financing options

Please write the number in the check box that best describe your perception

1	2	3	4
Not successful	Slightly successful	Successful	Very successful
10) Residents pay for services		()	
11) Microfinance loans and NGO grants		()	
12) Private public partnerships		()	
13) Increased government and County council funding		()	

Section D

Open ended questions:

14) What other reasons, in your opinion, are the causes of the current state of solid waste management in the larger Kajiado County of Kenya?

15) Do you think that increased funding would result in more effective and efficient solid waste management in Kajiado?

THANK YOU.

Appendix D: Alternative Financing Sources

Local Authority Expenditures by Year: Kajiado

Year	Expenditure	SWM Expenditure	Alternative financing of SWM
2002/2003	88,447,885.00	8,844,788.50	3,526,698.52
2003/2004	103,646,733.00	10,364,673.30	3,658,591.32
2004/2005	122,889,688.00	12,288,968.80	3,492,526.90
2005/2006	162,558,439.00	16,255,843.90	6,315,410.50
2006/2007	179,257,219.00	17,925,721.90	4,260,561.90
2007/2008	180,421,114.00	18,042,111.40	4,950,652.00
2008/2009	269,109,161.00	26,910,916.10	7,659,581.00
2009/2010	322,930,993.20	32,293,099.32	8,570,640.00
2010/2011	387,517,191.84	38,751,719.18	8,690,591.30
2011/2012	465,020,630.21	46,502,063.02	10,609,750.00
2012/2013	558,024,756.25	55,802,475.62	11,500,650.50
2013/2014	669,629,707.50	66,962,970.75	20,590,300.60
Source: Kajiado County Council			

Different financing options	Responses in support	Proportion of financing (Kshs)
Government Subsidy and Transfers	30	3000000
NGO's Involvement & Support	38	3500000
Credit and Fund Finance	56	1500000
Private Sector Participation	15	700000
Full Privatization or Outsourcing	21	1800000
Total	160	10500000