ROLE OF STAKEHOLDERS IN SUCCESSFUL SOLID WASTE MANAGEMENT IN MACHAKOS COUNTY, KENYA

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DECLARATION

I hereby state that this dissertation is my original work and has not been previously published or submitted elsewhere for an award of degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

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ABSTRACT

Rapid population growth and urbanization has resulted to serious problem in SWM. This is due to indiscriminate disposal due to inadequate involvement of waste stakeholders, finances and human resources. The problem of concern is lack of synergy between various stakeholders in SWM who include: Central government, local authority, NGOs and landlords and the role they play in management of SWM. The study was conducted in Machakos County due to its strategic location and its status of being part of Nairobi Metropolitan Region. Specifically, Machakos County acts as a dormitory to residents most of whom work in Nairobi and Machakos town. Moreover, it has many industries which contribute to a lot of solid waste. Unfortunately, there has not been good management of the services due to inadequate stakeholder engagement in their respective roles within the framework. The following objectives we used to guide the study: the role of local authority engagement, landlords' involvement, NGOs engagement and National government engagement in successful SWM. The method of the study adopted descriptive research design to evaluate various aspects under the objectives. A total population of 105 persons from households, markets, companies, local authority and National government were randomly sampled and interviewed. Likert scale questionnaires were used to collect data. The collected data was analyzed using SPSS and presented in tables. From the results, it is evident that, although key stakeholders have been involved in SWM it is to an extent and therefore there potential has not been fully utilized meaning further involvement can yield more and excellent results. Therefore, the recommends that a clear strategy for engagement among the stakeholders, which include, creating awareness, training employees, coordination and knowledge sharing.

Keywords: Waste, Stakeholders, SWM, ISWM, public participation, Management, municipal waste

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ACRONYMS AND ABBREVIATIONS

CBOs: Community Based Organizations

ISWM: Integrated SWM

NEMA: National management authority

NGOs: Non-Governmental Organizations

NWMS: National waste management strategy

PPPs Public Private Partnerships

RDT: Resource Dependency Theory

SPSS: Statistical Package for Social Sciences

SWM: Solid Waste Management

UNEP: United Nations Environmental Programme

WHO: World Health Organization

ANOVA Analysis Of Variance

DEFINITION OF TERMS

Public Participation: refers to collaboration of subjects/target community/stakeholders in particular way, on the implicit assumption that their contribution is a means to some further action, on their part, to bring about specific change Barnes (2005).

Stakeholder: refer to Individual or organizations (government and non-governmental) established with interest in SWM and therefore need to be engaged. (Sciarelli & Tani, 2013).

Solid Waste: Any item/material that is discarded by its owner and that is not discharged in gaseous form to the atmosphere, to a pit latrine or via a pipe or channel (UN HABITAT, 2010).

Waste: refers to any item or a substance that is either damaged beyond repair or can no longer be put to its intended use and is therefore to be discarded or parted with (KENAO, 2006/2007).

Municipal Waste: According to Cointreau-Levine and Coad (2000), municipal wastes refer to "wastes generated by domestic, commercial, institutional, municipal and industrial activities, excluding excreta, except when it is mixed with solid waste".

Management: the term as used in this study refer to general functions of an organization that entails; objectives, short-term and long-term plans, programing, budgeting, implementation operation and maintenance, monitoring and evaluation (Najeeb, 2014).

SWM: refers to all activities involving generation, storage, collection, transport, and disposal and treatment of solid wastes (NEMA, 2015).

CHAPTER ONE: INTRODUCTION

1.1. Introduction

This chapter presents the study background, the problem statement, the study objectives, the research questions, the study significance, and the study scope.

1.2. Background of the Study

Solid Waste Management generally refers to the application of strategies that would ensure an organized implementation of activities involving of collection, transport, processing, and treatment, and disposal of municipal solid waste (Henry, Yongsheng & Jun, 2006)). Specifically, SWM is closely linked to generation, storage, collection, transfer, transport, processing, and disposal of waste in a manner that is in line with best principles of public health, economics, engineering, conservation, public attitude, and other environmental considerations (Sharholy et al. 2008). Therefore, SWM is complex endeavor that requires the cooperation between the organization tasked with the main responsibility, and the households, communities, private enterprises, as well as Non-governmental organizations.

The complexity and dynamism of SWM is evident in its various systems. Its first instance is the area of generation where the management should begin. Indeed, reduction at the point of generation will effectively handle the solid waste menace. The next critical step, knows the composition of the waste so that appropriate management strategy is prioritized for SWM. For instance, biodegradable waste is a type of waste, typically originating from plant or animal sources, which may be degraded by other living organisms. On the other hand, wastes that cannot be broken down by other living organisms are called non-biodegradable. According to Marinela (2009) biodegradable waste can often be used for composting or must be a resource

for heat, electricity and fuel in future. Mostly, this produces additional biogas and still delivers the compost for the soil.

Globally, there has been a remarkable increase in SWM. Notably, this phenomenon is linked with tremendous growth in population size, around the world which has led to matching growth in industrialization, urbanization, and economic growth. Solid waste generation in municipalities shows different trends and positive correlation with economic development in terms of kg/capita/ day on solid waste generation at world scale. Fundamentally, these challenges are exacerbated by poor management within institutions tasked with the responsibility to manage solid waste. Ideally, these institutions should operate like corporate organizations and form a strategy of inters institutional collaboration.

The roles and responsibilities of stakeholders' role in contributing to environmental impact of their products have been not been given attention for some time. Extended producer responsibility, product take-back programme and the recycling of packaging products are identified as forms of stakeholder participation in SWM (Carlton & Thompson, 2009). In USA, a number of states have enacted legislation to ensure collection, recycling and reuse of electronic products through the engagement of producers and brand owners. The Electronic Product Recycling Law which was enacted in 2006 in Washington State requires the manufacturers of computers, monitors, laptops, and televisions to provide recycling services at no cost to consumers. In California, consumers are charged advanced recycling fees for electronic goods (Kahhat et al. 2008). In Canada, most of the provinces have adopted strategies to prohibit burning of waste and have introduced levies as an attempt to minimize waste and make consumers responsible for its disposal (Wagner & Arnold, 2006). Similarly, in New Zealand, a waste disposal levy was enacted in July 2009 to

reduce the amount of waste disposed (MfE, 2010b). So, the overall responsibility of stakeholders who include; designers, producers, brand owners, manufacturers, retailers, importers and consumers, is to ensure active participation in recycling, reuse and finally disposal of hazardous waste, as well as in traditional waste management systems implemented by the local authorities (Wagner & Arnold, 2006; Kahhat et al., 2008).

In Nepal waste is more of a problem in urban area than rural area. This is attributed to the fact that wastes generated in the rural areas are biodegradable and in most cases used as compost for the farms (Gautama& Herat, 2000). According to the Local Self-Governance Act, 1999, municipalities are responsible for managing solid waste, however they do not have the capacity to do so due to lack of proper and skilled resources to manage the solid waste, and misuse of finances allocated for this purpose (Water aid, Ibid). Despite this, Anschutz (1996) argues that sometimes municipalities play a highly positive role in stimulating community-based, this is through providing facilities such as equipment, composting sites, among others, establishment of legislation, financial assistance, and promotion of waste management SWM for groups that are involved in SWM. However, there are cases SWM is politicized and the attitude of the municipality remains till the time of elections and some policies get discontinued. There is mutual distrust between elected officials and informal community leaders in managing the solid waste. Community organizations that have proved their capacity to achieve improvements, are however, often able to convince the municipality of the need to help them. But this depends also on political circumstances. In today's context, community participation has become important because the government bodies to an extend lack the capacity to handle problems especially in the case of SWM. Community participation is considered important

because it is believed that its involvement in activities such as waste management helps them decide about their life and the issues that affect their daily life. It is also believed that community participation gives efficiency and effectiveness to the work.

Regionally, in Uganda the current operating systems in Kampala city are landfills and in skips. Communities without access to transfer stations resort to open disposal methods which include burning, burying, and indiscriminate disposal. There is rampant littering caused by the indiscriminate disposal of wastes in storm drainage channels, road verges and open lots (Kaseva & Mbuligwe 2005). The carelessly disposed wastes block storm water drains leading to floods, causing health hazards and poor aesthetic. In the same city, Institutions such as universities, schools, hospitals and business complexes are served by the private companies, while those not served transport their wastes individually to community collection points. The urban poor receive very low to no waste collection services due to inaccessible roads, unplanned facilities and neglect by the urban councils. Waste collection in most East African urban centers is not based on the total amount of waste generated but on the level of income of the service area (Okot-Okumu & Nyenje, 2011). They also state that, Satisfaction level for waste management is higher for the part of community that is willing to participate in waste management compared to those who have little or no interest in the same.

In Kenya, the challenge of SWM is real. About 80% of collection transport is out of service or in urgent need of repair (Gakungu & Gitau. 2012). In Nairobi often, service providers ask citizens to pay for the SWM services without consultation and involvement (Tukahirwa & Mol. 2012). In Kakamega County for example, the public do not actively participate in collection, transfer, or disposal of solid waste (Nyayiemi. 2012). It is due to this, that a holistic and integrated effort to minimize the

quantity of solid waste generated requires the cooperation and participation of waste generators, particularly the public (Samahetetal.2012).

Public concern and awareness have acted as SWM drivers in high-income countries (Marshall & Farahbakhsh, 2013). The public's willing to cooperate and participate in waste management relies on their awareness attitude and extending service coverage to all citizens by eradicating uncontrolled dumping of wastes remain key priorities in most low and lower-middle income countries (Wilson &Ingo, 2013). In Kenya, participation of all stakeholders is necessary for improving service delivery. However, collaboration between the public and the service providers is low, and this affects access to services (Tukahirwa, Mol & Oosterveer,2010).

SWM often takes a big amount of the total recurrent municipal budget. Despite the high financial burden, the counties usually struggle in provision of proper SWM services. USAID records indicate that developing countries utilize most of their budget in the waste management. This majorly affects the distribution of the remaining budget to serve the population on other needs. Oskamp (2005) notes that local authorities are analyzing whether to allow the private sector to do the SWM services or not. The reason behind this is that the public sector have lagged behind and has been inefficient in SWM due to poor management and the high costs involving SWM practices (Zaman & Lehmann, 2011). Increasingly PPPs have been viewed as the solution to improve municipal performance in SWM at lower costs. But even with new approach of partnership, financial aspects of municipal SWM remain critical for ensuring sustainability of the system. These concern budgeting, cost accounting, financial monitoring and evaluation aiming at recovering sufficient money to cover recurrent operational expenditures of the collection service as well as to stock up capital for new investments or large maintenance. These methods are too

rarelyutilized and the municipality barely knows the actual cost of providing the service (Alcott, 2005). While external capital may often be needed for major investments, the recurrent costs should by preference be covered by a combination of user fees, and local taxes. Also, cross-subsidization and/or financing from governmental sources may be needed to ensure equitable access to service (Alcott, 2005). The aim of the study is to establish the successful engagement of various stake holders in SWM within Machakos County.

1.3. Problem Statement

Management of solid waste has become significant as most global urban administrations are grappling with the huge solid waste generation. According to UNHABITAT (2010), about 1.7-1.9 billion metric tons of waste is generated in urban areas worldwide and Machakos County is no exception. This is due to population increase, rapid urbanization and industrialization, lack of proper and well-maintained waste management systems, inadequate stakeholder's engagement, efficient solid waste collection and transportation, inadequate personnel capacity and equipment and designated solid waste disposal site. This situation calls for synergy between all stakeholders to work together in order to be able to provide effective as well as efficient SWM system that can guarantee a healthy environment to their inhabitants.

Historically SWM was a prime roles and responsibilities of central and local government (Gidarakos, Havas & Ntzamilis, 2006; Davies, 2009). However, according to Rajamanikam, Poyyamoli & Kumar, (2014) municipal authorities has no capacity to tackle the problem as they lack of organizational financial resources and system complexity (Burntley, 2007). As a result, urban areas are environmentally polluted and public health is under threat from widespread waste hazards calling for

the need to incorporation all stakeholders in management process (Goven & Langer, 2009).

Similar studies done in Kenya regarding SWM dine in Eldoret (kipkoech2014), Lamu (munyoncho, 2013) and Nairobi (Ongoro & Musembi, 2012) ascertains that there is a concern of improper SWM across Kenya. Additionally, they give information on critical aspects of waste management such as generated quantity and composition, household disposal method, accessibility, and common trends of SWM challenges in Kenya. Notably, the local research community in this field raised concerns about the capacity and willpower of government officials who hold a major stake in SWM. In light of post-devolution governance, long-term strategic plans, foreign development loans, and the building pressure of urbanization, the current role of local government with regards to SWM has not yet been established an evidence that, this particular area is often overlooked. Yet, there is value in analyzing the perspectives of local authorities and other SWM stakeholders in order to form a clearer understanding of their role in practice. With such an understanding, effective steps can be taken to improve SWM thereby improving local health and the development of Machakos County.

1.4. Objectives of the Study

The main objective if the study is to evaluate role of stakeholders' in successful SWM in Machakos County.

The following are the specific objectives

1.4.**Specific objective**

1) To establish the effect of local authority engagement in successful SWM in Machakos County

2) To find out the effect of landlords' involvement in successful SWM in Machakos County
3) To establish the effect of NGOs' engagement in successful SWM in Machakos County
4) To find out the effect of national government engagement in successful SWM in Machakos County

1.5.Questions of the study

1) What is the effect of local authority engagement in successful SWM in Machakos County?
2) Is there an effect of landlords' involvement in successful solid management within Machakos County?
3) What is the effect of NGOs' engagement in successful SWM within Machakos County?
4) What is the effect of national governments' engagement in successful SWM within Machakos County?

1.6.Justification of the study

Most urban areas in Kenya and indeed relevant institutions are yet to take seriously, the management of solid waste. However, it's increasingly obvious that the current practice of public financed and operated SWM is becoming inadequate for today's needs especially in light of the growing urban populations. One fundamental area that the actors within SWM are yet to appreciate is that most of the challenges affecting the waste management sector are basically management related. For instance, some of them include inadequate management skills, bad governance, inadequate organizational skills, poor coordination among stakeholders and employees as well as improper financial planning. Therefore, this study is not only timely but also long

overdue. Indeed, it will help the county government of Machakos to identifying the institutional management laps that exacerbate SWM challenges, and make relevant department adjustments to their administrative strategy. Additionally, it will help the National Government find out areas with inadequacy within the SWM framework. For instance, there are various policies within this sector, but few focus on the area on strengthening institutional capacity for effective SWM. Indeed, this is an area that the national government can take interest in and act appropriately with a response that will not only benefit Machakos County but also the rest of 46 counties. More importantly, this study adds to the body of knowledge by identifying research gaps and areas that can form part of future research issues.

1.7.Scope of the study

Machakos County is administratively in eastern part of Kenya and composed of eight constituencies. These constituencies are Masinga, Yatta, Mavoko, Mwala, Machakos Town, Matungulu, Kathiani, Mathatani and Kangundo. The county according to the County Integrated Development Plan (2015) covers approximately 6208 Square km with a population of 1,098,584 based on the 2009 census. The males in the county are form 49% while the female forms the remaining 51%.The age distribution is as follows: 0-14years are 39%, 15-64 years are 56%, while 5% is above 65 years (CIDP, 2015). The population annual growth rate is 1.7% and the present estimates 264,500 households. Of these, only 17% have access to electricity (CIDP, 2015). The headquarters of the county is in Machakos town situated about 63km from Nairobi city. Machakos County acts like a dormitory for the workers who work in Nairobi, Kajiado and Machakos County and therefore it has experienced a rapid population growth over the year which in return has contributed to increased industrial,

commercial, clinical/medical and domestic waste generation sub-passing the sub-county ecological footprint.

1.8.Limitations of the study

The limitations of the study were time constraints, restriction to private owned estates and having to make arrangement in order to meet the owners.

Some respondents were reluctant to fill in the questionnaires and some did not return them at all. Some of the questionnaires I had issued were not given back.

There was no data collected from NGOs since the one that used to be there had either become inactive or relocated to other counties

CHAPTER 2: LITERATURE REVIEW

2.1.Introduction

This chapter highlights the role of various stakeholders within the SWM system. Specifically, it begins by underscoring the role of various institutions within the SWM framework. Notably the discussion in this chapter will be based on the specific goals of the research as it seeks to evaluate the role of each level of SWM and the loop holes within these roles. Additionally, it evaluates various theories of management and how they relate to the multi-stakeholder SWM. Finally, it identifies gaps in literature that need to be addressed for sustainable stakeholder's engagement in SWM.

2.2.Theoretical Framework

There are various suppositions that apply and are relevant in the stakeholders' role in the SWM. Notably, these theories are common within management study and are discussed as follows;

2.2.1. Stakeholders' Theory

Freeman (1984) developed Stakeholder Theory was in the '80s in the works of as noted by (Sciarelli & Tani, 2013). Notably, it generally postulates that the development and activities of an organization as due to several actions of the stakeholder. Specifically, the theory views organizations' main goals as a combination of the various interests central to the actors. Stanford Research Institute ideas gave rise to the bulk of the theory; of course with consideration of several works from organizational behavior, and resource dependence theory, (Freeman et al. 2010). Another root of the Stakeholder Theory can be found in the strategic planning approach to management (Sciarelli & Tani, 2013). The theory nonetheless has three challenges as follows: the need for management to understand the environment, to

respond to it, and to deal with the individuals and the organizations trying to influence management's strategic decision-making processes.

The Stakeholder Theory was first founded as a management strategy. Indeed, notably the theory was developed to facilitate managers in inn coming up with strategies to achieve organizational duties and more so increasing value to the organizations, (Sciarelli & Tani, 2013). Fundamentally, it assists organizational heads to find the balance between different engagements likely to impact upon the organization and affect inn pursuit of personal goals (Freeman & Philips, 2002). For instance, the waste management stakeholders in Machakos County can rely on the theory to collaborate in their activities for effective SWM. Undoubtedly, it takes an organization as composed of various layers of engagements of activities among stakeholders. To create value therefore, managers require constant engagement with other stakeholders (Freeman et. al., 2010). Observably, it offers theoretical framework upon which SWM stakeholders in Machakos County can operate.

2.2.2. Resource Dependency Theory

Resource dependence theory is one of the most influential theories of management. According to Hillman, Withers, &Collins (2009), the theory was first published in 1978 by Pfeffer and Salancick. Particularly RDT appreciates the influence that factors from outside the organization such as resources have on the general progress of the organizational goals (Hillman, Withers, &Collins 2009). Notably, organizations ability to get resources depends on the power it wields. Therefore, organizations are in constant competition with other partners as they battle for resources control. Furthermore, Sciarelli & Tani (2013) concurs that the approach views the environment as a sector requiring great connection. For instance, Davis, & Adam

(2010), observe that the success will based on various participants within the organizations in a bid to control resources. Similarly, this dependency will become a circle as every organization requires assistance from the other.

In the context of SWM, stakeholders get into this interdependence in order to succeed in their role of SWM. Therefore, the organizations who are stakeholders within the SWM system need to be active and engage each other in terms of working together to achieve efficient SWM (Davis, & Adam, 2010). The theory generally assumes that the reliance on essential resources in an organization impacts of the actions and decision of the organization. (Najeeb, 2014). Conceivably, organizations within the waste management system implement resources dependency in their services to attract support and attain efficient resource management in line with Resource Dependency Theory, they can rely on collaboration or seeking related strategies from outside the organization.

2.2.3. Network Theory

Network refers to social relation among individuals or among organizations contractual relationships; which include stakeholders, involved in strategic alliances, buyer-supplier contracts, or joint ventures. Therefore, these networks are important for working together among stakeholders especially those engaged in SWM.

Basically, it encourages the managers to give attention to useful stakeholders that will enable the organizational efficiently accomplish its set goals (Sciarelli & Tani, 2013). Fundamentally, the concept acknowledges the organization be overwhelmed by demands from various stakeholders. Otherwise, these can be used to evaluate them and know the most relevant worth partnering with or engaging going forward.

Thereafter, then it is possible to agree on the mode of sharing responsibilities based on each stakeholders strengths (Sciarelli & Tani, 2013).

The issues of solid waste management have currently taken a global scale with scholars seeking to understand its impact on the environment and what organization with mandate can do to make it better (Barton, 2012). For the developing countries, scarcity of resources, socio economic inequalities, rapid urbanization among other social and political issues have been the main hindrance to effective SWM. (Marshall & Farahbakhsh, 2013). Therefore, it is imperative to employ network approach as a model that will guarantee sustainable solid waste management. Network theory therefore offers great viable strategy for understanding how organizations can network to achieve sustainable SWM. As stakeholders continue to engage each other, they find it very easy to work together, share responsibilities and even resources. Additionally, their goals tend to comment each other and due to similar behavioral structure. Indeed, how tight organizations are determined how they control their information and resources thereby becoming more influential within a given network.

2.2.4. Institutional Theory

Institutions relevance to success of organizations is a fact appreciated in various spheres of academia (Najeeb, 2014). Indeed, this is supported by the main belief that institutions are the functioning units of an organization. According to Kessler (2013), institutional model help in understanding the management of organizations and various services offered to the consumers. Notably, the theory explains some of the pertinent organizational behaviors that goes beyond economic understandings, and that's the reason for its influence among scholars. For instance the fundamental idea of the theory is that adoption and retention of various organizational practices are mainly influenced by the need to conform and gain legitimacy from social perspective

other than the technical pressure for economic success. However, while institutional theory has succeeded in becoming the dominant theory to study macro-organizational phenomena, there is a danger that the theory has been stretched far beyond its core purpose to understand how organizational structures and processes acquire meaning and continuity beyond their technical goals.

Normally organizations do not operate in a vacuum. According to Berthod, Grothe-Hammer & Sydow (2017), organizations there are factors affecting organizational environment from the outside that must be dealt with such as the laws under which it operates, culture, and actors it engages. Therefore, the outcome of organizational strategy in terms of rules and beliefs reflects the choices in terms of structures and goes a long way in demonstrating organizational system as far as institutional practice is concerned (Kessler, 2013). However, the strategies and symbolic basics can vary based on their regulative, cognitive or normative influence. For instance, Nongovernmental organizations operating transparently in terms of organizational structure and with a specific physical location likely to gain more trust and attract more funds among donors. Similar, a government body will get more support if it is considered transparent and accountable in its operations. In the case of SWM, developing adequate institutional capacity is necessary for the efficiency in operations and stakeholder's collaboration.

2.3.Empirical review of literature

The success of any SWM depends on the engagement of various stakeholders who for the working group in the solid waste management system. Certainly, to realize accountability, the expectation placed upon such stakeholders must clearly be defined in terms of responsibility. According to Davidson (2011), sustainable SWM differs

from various municipals in view of the various stakeholders and indeed, the diversity of roles (Okot-Okumu, & Nyenje, 2011).

2.3.1. The effect of Local Authority in Successful SWM

Issues of SWM in low income settlements are of immediate importance in urban areas of most developing nations (Schlueter, 2017)). Therefore, the Local authorities have to carry out their mandate to contribute to successful SWM.

Specifically, the county local authorities according to the NWMS (2015) have the role of waste collection, transportation, disposal, and issuance of relevant license to actors within the waste management system. Under waste collection, the Local authority has the responsibility of zoning the waste collection areas and collection of the waste momentarily in a designated point or from area to area. Additionally, it ensures waste collection amenities do not become a nuisance buy regularly empting them and disposing the waste (NEMA, 2015). Under Waste transportation the local authorities have responsibility of ensuring the transportation of the waste is done by licensed NEMA trucks and vehicles and disposed at the designated site; which is equally approved by NEMA. Additionally, the local; authority has the duty securing the dumping site using a fence so that the waste is protected from being spread by wind and there is a designated security to man the site.

Moreover, it is the duty of the local authority to ensure that the waste set for dumping is adequately weighed and credible records made in tones. Furthermore, it is the responsibility of the local authority to develop and maintain roads within the dumping site to ensure that there is adequate access to every part of the site. Besides, the local authority has the duty of reinforcing the solid waste, spreading and covering it to ensure that they are not blown around by wind. According to the NWMS (2015), any

illegal activity that can occur within the site, management of dumpsite fires, and general security is also the role of the local authority; hence, it should have adequate control measures to attain these responsibilities. With regards to the Requirement for licensing, the Local authority has the duty to ensure waste transportation vehicles have NEMA licenses and acquire licenses to operate waste disposal sites. Therefore, the County Governments and their relevant local authorities in Kenya have the general mandates of ensuring constant enhancement of methods of solid waste collection, transportation, and disposal facilities. Understandably, careful administration of these responsibilities is expected to bring about effectiveness in the role.

However, most urban areas have inefficient waste collection and systems of disposal. Nairobi for example has poor waste collection of about 30-40% of waste generated not being collected and with a50% deficit of the population served. On the other hand, Nakuru only collects 45% of the waste generated is collected of this, only 18% is recovered while the rest accumulate in the environment (NEMA, 2015). Waste disposal in major towns in Kenya including Machakos County, remains a major challenge since the local authorities are grappling with management issues. Particularly, there is poor management and exhibited through lack of stakeholders' collaboration.

2.3.2. The effect of Landlords' involvement in successful SWM

The landlords have the responsibility over the commercial wastes produced within their premises. Under the duty of care, both residential commercially are businesses; hence, they equally produce commercial waste. Therefore, Landlords/Letting Agents have a responsibility to ensure there is adequate waste management within their premises. Particularly, any waste coming from construction activities are solely

within the responsibility of the landlords. In Kenya, the Landlords are expected to include solid waste collection measures during construction and operation of their premises. Therefore, the landlords help the local authority in the collection of the solid waste at the householder level for collection, transport, and disposal either by the local authority or their private waste disposal agents.

Additionally, the landlords have the responsibility of setting up adequate waste storage point within their premises, to prevent littering around the area either by wind or tenants. According to Okot-Okumu, & Nyenje (2011), the storage points keep the waste in general hygienic condition until such as a time that they are collected. Besides, an adequate storage point prevents pest and vectors of diseases such as mosquitoes and rats. The capacity of the storage point generally depends on the amount of waste produced within a given residential units. In most cases, the landlords construct a small room outside the gate of the residence that serve as solid waste storage as well as collection points. In the slum areas where the local authority provides collection points and facilities, it is the responsibility of the landlords to ensure that their tenant dispose their waste at the designated waste storage sites such as large bins or the open temporary collection point. Notably, the storage areas provided by the landlords help have the following roles; the points contain the waste, minimize contact between waste and surrounding environment, and to make efficient the process of removing the waste to the dumpsite.

However, the landlords are yet to maximum fulfill their role in SWM due to poor compliance and implementation of waste management regulation. Particularly, the department the public health under the county with the mandate of enforcing these requirements is understaffed. There is no clear communication that would lead to a sense of responsibility among the landlords and the tents, and indication of poor

management within the local authority and departments which are supposed to engage the landlord. In most cases for instance, the Landlords fail to provide the solid waste storage points, while the tenants fail to dispose wastes to these points even in cases where it is provided. Eventually, this leads to littering of the neighborhood exacerbating the SWM menace.

2.3.3. The effect of NGOs' Engagement in Successful SWM

The Non-Governmental Organizations provide critical role within the SWM system. The term NGO may refer to such diverse organizations as churches, universities, labor organizations, environmental organizations is used to describe organizations such as churches, universities, donor groups, and environmental groups among others working to influence issues of community interest. According to Mwaura (2015), Non-Governmental Organizations (NGOs) are not directly and constantly drawn in community projects; therefore, are not immediate bodies. For instance some of their roles include: advocacy, awareness creation, funding mobilization, and sensitization and as a link between the overall authorities and the local communities. Awareness-raising, advocacy, and decision-making. Donors as NGOs, provide donor funds that can support the local authorities in acquiring equipment for efficient SWM. Tan, (2012) notes that World vision for instance is an NGO working with community-based organizations in waste management in Mombasa. Particularly, the NGO Keeps records and have the database of SWM actors within the county.

NGOs are essential actors within the SWM system due to their operative nature within the public. Therefore, they find it easy to create awareness among the public and their participation along with CBOs is essential and integral part for efficient SWM (Ch. Raghumani Singh & Mithra Dey, 2015). Under the National SWM Strategy (2015), the NGOs and the civil society organizations are classified together

with similar roles of promoting or undertaking income generating ventures in waste management initiatives. Besides, they represent the public's interest in the SWM agenda, nationwide and in support in identification of illegal waste related activities. Besides, the policy provides that the NGOs and the Civil Society organizations have the duty of advocate for change in the public's knowledge, attitude and practice towards sustainable waste management (NEMA, 2015). However, Tukahirwa in a study about the responsibilities of NGOs and CBOs major towns of East Africa, argues that the NGOs works closely with the CBOs and as such, their roles are somewhat overlapping. Therefore, NGOs have been recognized for their momentous help towards increased access to basic services including hygiene and solid waste (Tukahirwa, 2011).

Occasionally, the engagement of NGOs is supported by external donors who appreciate and know the value of their role; essentially foregoing traditional government institutions with the original mandate in solid waste management. One important thing about NGOs, is that it is flexible and capable of adjusting fast with the prevailing condition such as adjusting to economic, political, natural and demographic changes within their area of operation; making them attractiveness (Tan, 2012). According to, Rajamanikam *et al.* (2014), NGOs' programs within the SWM system, enhance the much-needed awareness and education, encourage separation at the source, collection, and utilization of wastes as raw materials that can be relied on to generate more job opportunities. However, these organizational are equally faced with the challenges of financial constraints that limit the NGOs operation within the waste management system. In situations where donors offer funding, Mwaura (2015) notes that they in most cases dictate aspects of the waste management where the funds must be put. In such cases, the NGOs fail to respond to the local communities' priority area

of SWM. The resultant effect is that the role of the NGOs in SWM has not been adequately felt by the local community.

2.3.4. The effect of National Government's Engagement in Successful SWM

The constitution of Kenya 2010 established two levels of government which are distinct but are interrelated and dependent. Under the waste management for instance, the entire responsibility lies with the County government and its relevant departments such as the town as well as urban authorities. However, the national government still retains the overall policy role in so far as waste management is concerned. For instance, The Kenya National Environment Policy (2013) under waste management provides that the government has the role of developing an integrated NWMS; which may include appropriate economic inducements. Additionally, the national government has the overall responsibility to establish structures and motivation for clean production, recovery, recycling, or re-use of waste. In 2016 for instance, the government banned the use of polythene bags in Kenya to as a way of reducing solid waste menace in the country. Under the national government still, the National Treasury has the duty of channeling funds to the respective government agencies and institutions for development of waste management initiatives and facilities (NEMA, 2015).

The National Environment Management Authority (NEMA) is the principle national governments organization on matters environment, including SWM. Under the National SWM strategy (2015), NEMA has the mandate of formulating policies, legislations and economic instruments relevant to achieving sustainable waste management. Besides, NEMA develops and disseminates public information on the regulatory requirements for waste management in Kenya, which include the SWM. Indeed, their responsibility has direct bearing on the counties, since they also enhance

the capacity of the county governments on waste management systems and approaches applicable in their respective counties. To ensure that there is adequate public information on SWM, the agencies hold public awareness sessions (for example, school workshops, public consultation exhibitions and public events) on waste management initiatives, and support the dissemination of waste management research and development findings to the public. More importantly, it undertakes enforcement activities of the laws developed on SWM and surveillance exercises on illegal waste related activities.

Notably, urban areas such as Machakos County relies on the policy and directions of the NEMA, as provided through the County governments in SWM. Therefore, county government acts as the central governments for the various towns and urban areas under its jurisdictions. Under the National SWM Strategy, the county governments have the mandate of drawing up action plans for implementation of applicable SWM systems within their counties. Besides, the counties have the role of Sourcing for adequate funding for development of sustainable waste management initiatives in the entire cycle. In view of the various stakeholders within the waste management system, the county is required to Put in place measures for enhanced Public-Private-Partnerships (PPP), benchmark on best practices of appropriate technologies, and undertake periodic clean-up activities within their counties. Notably, the urban and town managers work under the stewardship of the county governments, in this regard therefore, the counties role is to provide equipment for waste segregation and transport systems, zone the waste operational areas, and continuously manage activities/facilities to ensure all the waste is transported to the designated waste disposal sites. Moreover, the County governments ensure wide coverage and no littering of waste through improved collection methods and facilities, and

progressively improve the designated official county disposal site towards a sanitary landfill. However, these government agencies are serious constrained in terms of finance, technical and staff capacity. Therefore, there is no efficient SWM within towns such as Machakos County.

2.4. Integrated Sustainable Solid Waste Management.

A sustainable integrated approach to waste management will have to consider community and area-specific issues and come up with an appropriate set of solutions unique to each context. According to UNEP (1996), these are sound practices that function together to achieve defined solid waste policy goals, while appropriately responding to the entire set of conditions that constrains the choices available in specific management levels. For Integrated Sustainable Waste Management (ISWM), there is the need for the system to be inclusive, represent the full spectrum of recognized as well as unrecognized stakeholders and be financially sustainable. Notably, SWM consists of a variety of activities, including reduction, reuse, recycling, and composting. Furthermore, it rests on the base of sound institutions and pro-active policies as well as a strong and transparent institutional framework is essential to strategic management of solid waste.

The waste management hierarchy serves as an entry strategy for waste reduction practices. It is prioritizing waste management guide to achieve the best overall environmental outcome. The general priority of the waste hierarchy is prevention, reduction, reuse, and recycling. Therefore, the implementation strategy will ensure institutions networking with other stakeholders to share roles and resources for effective management. Conceivably, Participatory waste management as an approach guarantees more durable decision-making and contributes to the construction of more sustainable communities. For example, participatory resource management involving

the informal recycling sector as stakeholders is effective in tackling crucial challenges in waste management. Conceivably, the strategies will lead to better management within public institutions.

2.5. Summary and Gaps in the literature

The general strategy of SWM in Kenyan towns is almost the same countrywide. Mainly, the approach is characterized by legislation and regulatory framework; establishing institutions with a mandate over urban waste management. Indeed, the Constitution of Kenya 2010 has devolved SWM to the County government; which has subsequently handed the implementation duty to the local urban or town management authority. Conceivably, the legislative and regulatory frameworks have incentives and instruments that are expected to influences individuals' SWM conscious. Additionally, the legislation and regulations have provisions that control, directs, and supervise the roles of other stakeholders within the waste management framework. Observably, Legislation and the rules are set up for particular purposes and are in most cases unable to fast respond to the changing circumstances of solid waste management. Particularly, they are detached, disjointed, and imperfect, thereby hindering partnership among institutions (White, Dranke, & Hindle, 2012). Even in cases where there is partnership, the legislations are inadequate in terms of tools and instruments of enhancing management coordination of such partnerships nevertheless come into being, existing legislation normally provides few tools to enhance their coordination and management.

However, this legislation and regulatory framework have generally failed in realizing effective SWM. Particularly, there is not the only duplication of roles, but the agencies are riddled with financial constraints as well as general institutional constraints. Notably, information about NGOs involvement in urban services'

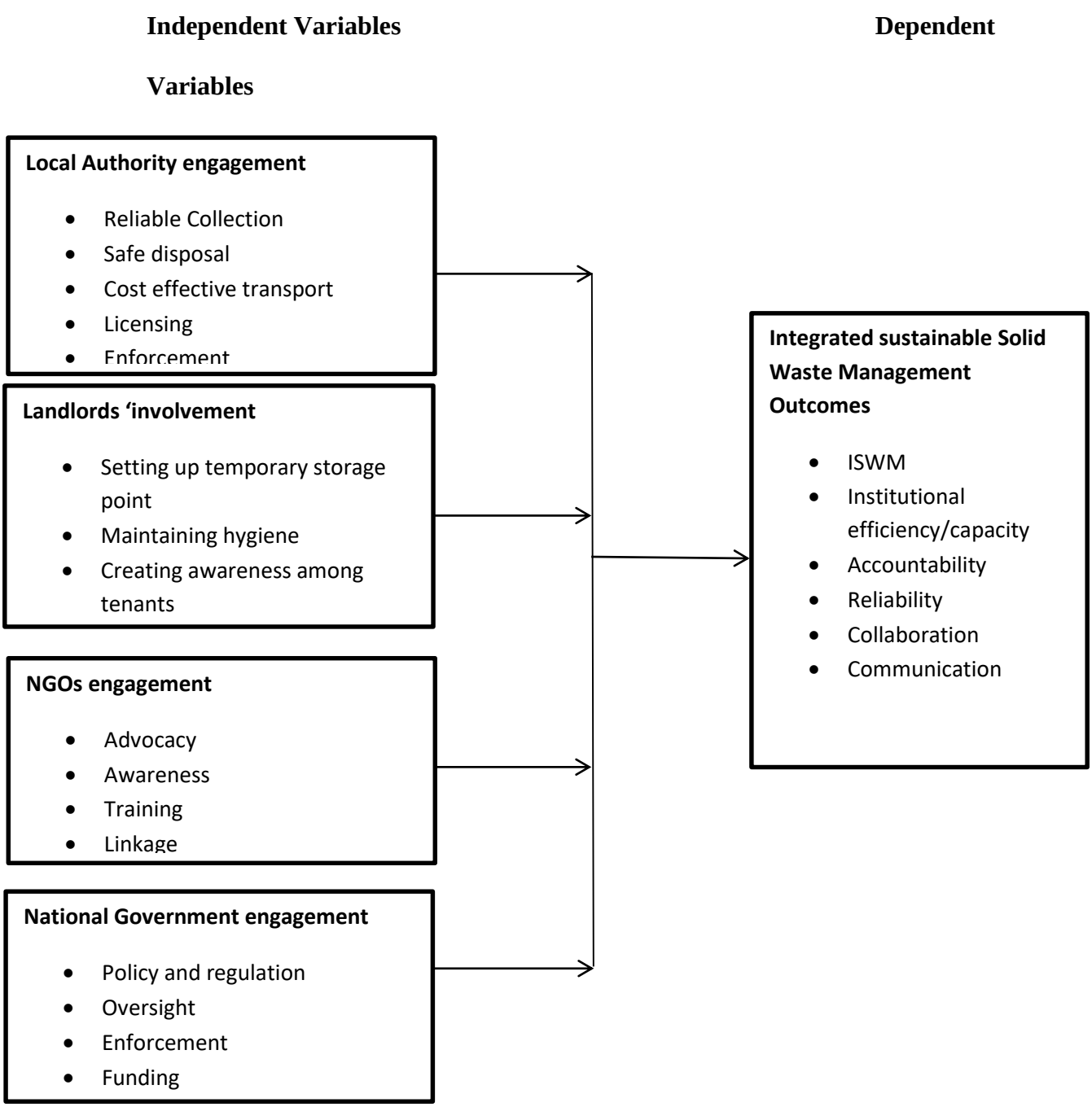
provision is rare due to limited data on the numbers and types of NGOs; the communities they serve; the kind of sanitation and solid waste activities they are engaged in; and their effectiveness as well as funding mechanisms. Furthermore, limited evidence and little systematic knowledge exist of the actual contribution from NGOs to sanitation and solid waste improvement. Indeed, this observation proves that the contribution of NGOs in the field of SWM has not been well documented. Therefore, there is inadequate understanding of the exact role of these organizations and their actual or potential contribution to the sanitation and solid waste sectors. Conceivably, the growth and diversity of the NGO initiatives require a more in-depth review of their contributions to sanitation and SWM. Similarly, there is little information on the role of Landlords and their contribution to SWM. Indeed, this could explain why there is no responsibility on the side of the tenants especially while disposing solid waste.

Consequently, this thesis attempts to dissect and understand the work, impact, and sustainability of these stakeholders within the SWM framework in satellite town like Mavoko and Machakos towns. Specifically, the thesis aims to go beyond the normal generalization that has been evident from literature, instead choosing a specific town and evaluating the role of these key actors in the town

2.6.Conceptual Framework and Model

Conceptual framework refers to the variables used to demonstrate the association between his/her variables of study. A variable is a measure characteristic that assumes different values among subject. Independent variables are employed in the study to determine its impact on other variables. According to Mugenda & Mugenda (2003), the dependent variable attempts to indicate the total influence arising from the influence of the independent variable.

Fig: 2.1: Conceptual Model and Framework



Source: Author 2018

2.7.Operationalization of variables

Table 2.1: Operationalization of variables

Independent variable	**Indicators**	**Measurement**
Local authority engagement	• Reliable Collection • Safe disposal • Cost effective transport • All private actors licensed • Compliance with laws • Designated land for dumping solid waste • Enforcement of solid waste collection at household level • Interagency Collaboration	• 5-point Likert scale The mean of the responses was used to demonstrate the level of engagement
Landlords involvement	• Availability of storage point • Hygiene neighborhood • Responsibility among tenants • Limited quantity of waste disposed • Waste segregation	• 5-point Likert scale The mean of the responses was used to illustrate the level of engagement
NGOs engagement	• Accountability • Transparency • Resource allocation • Awareness • Reliable linkage	• 5-point Likert scale The mean of the responses was used to indicate level of engagement
National government engagement	• Adequate Policy and regulation on SWM • Adequate Enforcement • Sufficient Funding • Security • Clean and healthy environment • Interagency collaboration	• 5-point Likert scale The mean of the responses was used to show level of engagement
Dependent variable		
Integrated sustainable SWM	• Transparency among institutions • Accountability among institutions • Efficiency among relevant institutions • Desired strategy among institutions s individuals (Reduction, reuse, and recycling, of solid waste)	• 5-point Likert scale The mean of the responses was used to show the level of engagement.

CHAPTER 3: RESEARCH METHODOLOGY

3.1.Introduction

Aspects discussed in this chapter include: the research design, target population, sample size, sampling procedure, and data collection. Additionally, data analysis variables are presented here.

3.2.Research Design

The research employed a survey study design where samples was be selected randomly in the population under study. Research design samples information from the population under study to understand; individual insight, feelings, manners, or value (Bryman, & Bell, 2015). It is economical, the data obtained is standardized, and easy to compare. Generally, it employed quantitative research methods. Particularly, quantitative method is prioritized since it is precise. Mugenda & Mugenda, (2003) affirms that quantitative method is a vital attribute for decision making while selecting a research method. Specifically, it can be faster compared to qualitative methods for it is possible save time.

3.3.Population of the Study

A population is the total sum of elements with common observable attributes about which some inference can be drawn (Creswell 2003). The target population for this study was drawn from the eight sub-counties of Machakos; with specific focus on the department. The sub-counties include: Mavoko, Machakos, Mwala, Kathiani, Matungulu, Kangundo, Yatta, and Masinga. The main areas for consideration during the study were the relevant departments within the County, NGOs/ Civil Societies, and representative of the National government which is the NEMA office. Furthermore, the landlords of three estates within Machakos County; and one estate within Machakos sub-county was part of the study.

There are four Stakeholders engaged in SWM within Machakos County. Among these stakeholders, the target populations are the staff and landlords. The national government and local authority have 1 and 3 departments respectively within these departments, the target respondents are 50 employees from the departments including (Housing, Environment, Public health, Lands, National Environment Management Authority, and the Sub-County Administration). Besides, there are about 3 NGOs operating within Machakos County each having at least five staff. Of the three estates within the selected Sub-Counties, the study focused on ten households per estate (CIDP, 2013). Therefore, the target population for the study was 105 persons.

3.4. Sampling Size and Sampling Technique

There are two types of sampling that were employed in the study; probability and non-probability sampling techniques. According to Bryman and Bell (2015), probability sample presents nonzero equal chance for each population element to be selected. The study adopted convenience and snowball sampling technique to reach out to the NGOs. Besides, convenience sampling was used to access landlords or their agents for the purpose of data collection. Purposive random sampling on the other hand was used to reach out to institutions and departments that were involved in the study.

Table 3.1: Sample Population

No	Stakeholders	No. Of departments/ estate	Target Population	Sample Population
1	National Government	1	20	9
2	Local authority	3	30	23

3	NGOs	3	15	6
4	Landlord	3	30	15
Total		**10**	**105**	**53**

3.5.Instrumentation and Data Collection

The study information was collected through structured self-administered questionnaire among the officers working within the identified departments, NGOs' managers, and Landlords or their representatives. Indeed, all variables were operationalized using the literature on the role of each stakeholder within the SWM and to what extent this is done. The first part of the questionnaire included questions about the respondent's personal information such as their name, age and designation]. Additionally, it entailed the duration in the position and the role with the waste management. The second part consisted of questions measuring all the variables on the SWM. The respondents are expected to rate these questions based on a Likert scale only indicating whether they agree, strongly agree, disagree, or strongly disagree on each variable.

The questions were mostly closed ended to facilitate fast decision making and acquire specific information. Open ended question were also used to get in-depth clarification of the data sought, or help the respondents put their own opinion. The questionnaires as instrument of data collection are preferred because they are easy to use, and cost effective. The data was collected among the staffs of the five departments within Machakos County Government and three NGOs; staff and landlords within a total of twelve housing units in two main estates within the town. Procedurally, an introductory was obtained from the University and a permit from the local authority such as the local chief to make the study transparent and valid. Thereafter, there was

a pre-visit to the respondents; especially the departments for the purpose of introducing the intention to carry out the study and familiarize with the environment of the study. During this period, respondents were approached and those ready to respond to the questions in the study instrument were given a go ahead, while those willing to remain with the questionnaires for later collection were also be given some. During the second visit; which was the official day of administering questionnaires to individuals, the researcher was directly involved in guiding the respondents appropriate.

3.6. Pilot test

Reliability analysis based on Cronbach alpha was computed to determine the internal inconsistency of the variables under study. The questionnaires were pre-tested within the faculty and sent to academics who are experts in the field of management research; including the supervisor for purposes of establishing their reliability and validity. Indeed, this helped in preventing any vagueness and misunderstanding with minor adjustments to wording and sequence of the questions (Bryman, and Bell 2015). Additionally, the pilot test was conducted in the department of environment Machakos County, to establish the questions' wording, and formatting as well as their adequacy.

3.7.Data Analysis and Presentation

The questionnaires and field notes were edited to validate the data and make them tidy as well as complete. Data processing and analysis will begin as soon as the execution of each step of the study is complete. Both descriptive and quantitative techniques will be utilized in the processing, analysis and presentation of data. This is because descriptive methods tend to be strong in validity but weak in reliability while quantitative techniques tend to be strong in reliability but weak in validity. Data

collected from the field was coded and entered into the computer for analysis using the Microsoft Excel package. Quantitative data was analyzed using descriptive statistical tools such as frequencies, percentages and means (Mugenda & Mugenda, 2003). Besides, Statistical Package for Social Sciences (SPSS) was used in data analysis, where descriptive statistics and regression analysis was conducted, analyzed and tabulated. The quantitative data was presented in terms of chats and descriptive essay.

3.8.Ethical Considerations

Before the study, a request letter was sent to the institutions requesting for the permission to carry out the study. Particularly, the letter gave an undertaking that the data sought was solely be used for the study. Additionally, the revised questionnaires were administered to the respondents with a cover letter explaining the academic purpose of the study and assurance that no third party was to get access to their data.

3.9.Diagnostic Test

The paper applied logistic regression in analyzing the correlation between the variables. According to Gogtay, Deshpande, & Thatte (2017), logistic regression analysis is generally used when the dependent variable is binary in nature. The predictor variables can be quantitative or qualitative in nature; for instance, true/false, yes/no, agree/disagree etc. Unlike linear regression, logistic regression does not require a linear relationship between independent and dependent variables. In this study, the independent variables are not internally related and there is adequate sample size; thereby qualifying logistic analysis for its correlation. The study regression model that was adopted is presented here below:

$$\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon}$$

Where by:

Y = Level of Success in SWM

B_0-β_4= Constant (The intercept of the model)

X_1= Local Authority

X_2= Landlords

X_3= Non-Governmental organizations

X_4= Central government

ε= error term

CHAPTER 4: DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1.Introduction

This chapter presents the outcome and interpretations of the study as per the research objectives. Data analysis was done using statistical, descriptive, and regression analysis. Descriptive analysis was used to address the profile of stakeholders' involvement in SWM and regression analysis was used to establish the impact of the study objectives on the successful SWM in Machakos County. Lastly ANOVA test was used to compare the relationship of the objectives (the independent variables) to ISWM (the dependent variable).

4.2.Response rate

The response rate was 71.6% out of 53 questionnaires administered, 38 were filled and returned. The 28.4% different in return rate was due to the fact that, questionnaires on NGO's were not filled as during the study it was found out that they have either become inactive or relocated to other counties like Nairobi. Therefore, no responses on NGOs were filled.

4.3.Social demographic characteristics of the respondents

This is the group defined by sociological and demographic characteristics. Demographic characteristics refer to age, gender, working experience and level education. Sociological characteristics are objective traits that help in evaluation the strength of the response given on particular issue under consideration under the substantive objectives.

4.3.1. Gender distribution

The study desired to determine the gender distribution among the participating respondents in NEMA, Machakos County SWM department, department Public Health and Sanitation, the representatives of the markets and housing units in the three stated estates. The results are as shown in the table below:

Table 4.1: Gender distribution

	Frequency	Percent
Male	22	57.9
Female	16	42.1
Total	**38**	**100.0**

From the table, it is evident that most of the respondents were male at 57.9% while the Female are very close at 42.1%. Base on the results it is an indication that there are more male involved in SWM than females. Nonetheless, there are more females at the solid waste department, which is responsible for the close gender gap.

4.3.2. Age distribution

The Study desired to determine the age of the each respondent from the housing units, departments of Public health, Environment-solid waste, National Environment Management Authority all working within Machakos County. The estates that were considered in the study are Syokimau, Athi-River, and Mlolongo and Machakos Township. Also Athi-River and Machakos markets were considered in the study. Particularly, this was to help in the determination of the age distribution for respondents. Results showed that most of the respondents' age was between 26-35 years which amounted to 56.6%, followed by those at 36-45 years at 28.9%. From the statistics it is evident that most of the participating respondents were aged 26-45 years. Meaning that majority of respondents were of mature age and understood the role of stakeholders' in successful SWM, in Machakos County.

Table 4.2: Age distribution

	Frequency	Percent
below 25 years	1	2.6
26-35 years	20	52.6
36-45 years	11	28.9
46-55 years	5	13.2
above 55 years	1	2.6
Total	**38**	**100.0**

4.3.3. Education

The study sought to evaluate the level education of the participants. This was to determine whether education levels of respondents had an influence the role of stakeholders' in successful SWM, in Machakos County. The participants indicated their level of education and the results were shown in table below. The secondary level was dominant with 31.6%, followed by degree with 26.3% and a tie of diploma and masters level with 13.2 %. The outcome means that the respondents have knowledge of questions and know how to fill the questionnaire giving effective answers.

Table 4.3: Educational level

	Frequency	Percent
Primary	3	7.9
Secondary	12	31.6
Certificate	2	5.3
Diploma	5	13.2
Degree	10	26.3
Masters	5	13.2
Others	1	2.6
Total	**38**	**100.0**

4.3.4. Duration in the Department/Estate

The study attempted to find out the duration that the officers have taken in the department, or the housing unit representatives have been at there. For the officers, this helped in determining their level of experience, while for the housing unit representatives; it helped to determine the strength of information given. The results are shown in the table below. From the results, it is evident that 39.5% have been working or stayed in the county for less than five years while 42.1% have been either stayed in the estates or worked in the departments for 5-10 years. Similarly, 13.8% have been working in the department or lived in the estate for 11-20 years and 5.3% have either worked in the county or managed a resident for more than 20 year. The import of these results is that most of the respondents had enough experience, knowledge, and skills in the role played by different stakeholders' in successful SWM, in Machakos County. The results also indicated that the competence and skill increases with increase in years of performing the Job.

Table 4.4: Duration in the Department/Estate

	Frequency	Percent
Less than 5 years	15	39.5
5-10 years	16	42.1
11-20 years	5	13.2
Above 20 years	2	5.3
Total	**38**	**100.0**

4.4.Descriptive analysis

This division represents the descriptive analysis of the outcome of local authority engagement, landlords' involvement and national government engagement. The role of stakeholders' involvement was undertaken to determine to which extend it affects the successful SWM in a likert scale. The scale ranged from strongly disagree (1), to strongly agree (5). Little involvement of the independent variable was represented by

mean score of less than 2.5 on the continuous likert scale, moderate involvement mean score of 2.5-3.4, and great involvement by mean score of 3.5-5. A standard deviation of > 0.9 implied a significant difference on the effect of the variables among respondents.

4.4.1. The effect of local authority engagement in successful SWM.

The effect of local authority engagement in successful SWM in Machakos County was the first objective of the study. The respondents rated on the Likert scale, and the responses were obtained in table 4.5. The lower standard deviation of 1.089 indicated that the variation between the respondents was low. From the composite mean of local authority engagement which is 2.78, it is clear that local authority has not been fully engaged in SWM.

Table 4.5: Local authority engagement

	N	Mean	Std. Deviation
There is reliable collection of solid waste in Machakos County	38	3.00	1.708
There is safe disposal of solid waste	38	3.37	1.584
The transportation of solid waste within Machakos County is cost effective	38	2.87	1.379
All private actors in solid waste management are licensed	38	3.95	1.089
There is compliance with SWM laws and regulations within Machakos county	38	3.32	1.338
There is designated land meant for dumping solid waste within Machakos County	38	3.92	1.566
There is adequate enforcement of solid waste management regulations and laws at household level	38	3.00	1.489
Composite mean		**2.78**	

4.4.2. The effect of landlords' involvement in successful SWM.

The effect of landlords' involvement in successful SWM in Machakos County was the second objective of the study. The lowest standard deviation of 1.102 indicated that the variation between respondents was low. From the mean of landlords' involvement which is 3.44, it is clear that landlords are highly engaged in SWM.

Table 4.6. landlords' involvement

	N	Mean	Std. Deviation
There a safe and accessible waste storage point/collection site within the resident	38	2.89	1.705
The is no litter in the neighborhood	38	3.97	1.102
Tenants dispose waste at the designated point	38	3.58	1.328
All the waste is collected from the storage point	38	3.32	1.338
Composite mean		**3.44**	

4.4.3. The effect of NGOs' engagement in successful SWM.

The effect of NGOs engagement in successful SWM in Machakos County was the third objective of the study. During the study no data was collected from the NGOs. It was found out that they have either become inactive or relocated to other counties like Nairobi.

The effect of National Government engagement in successful SWM.

The effect of National Government engagement in successful SWM was the fourth objective of the study. The lowest standard deviation of 1.297 indicated that the variation between the respondents was low. From the mean of national government engagement which is 3.4, it is clear that national government is highly involved in SWM.

Table 4.7 National Government engagement

	N	Mean	Std. Deviation
There is accountability within the SWM in Machakos County	38	3.37	1.441
There is adequate awareness and information about SWM within Machakos county	38	3.42	1.328
There is reliable linkage and engagement of stakeholders within the SWM within Machakos-County.	38	3.32	1.338
There is adequate policy by the National government to support effective SWM	38	2.87	1.436

There are adequate regulations by National Government agency like NEMA to support SWM	38	3.11	1.521
There is inadequate enforcement of the regulations and laws on SWM	38	3.24	1.384
There is adequate security within areas designated for solid waste sites.	38	3.68	1.297
There is a clean and healthy environment free from Solid waste nuisance and hazards	38	3.68	1.416
The National government is adequately engaged by the local authority in SWM	38	3.79	1.298
There is inadequate financial allocation for SWM	38	3.05	1.335
Composite mean		**3.4**	

4.5.Inferential statistics

Correlation results were generated using inferential analysis, model of fitness and analysis of regression coefficient and variance.

4.5.1. Correlation analysis

The relationship between the dependent and independent variables were examined using correlation analysis using Pearson correlation coefficient (r) and p-value analysis. A correlation was perceived significant when the p-value was less than 0.05. Correlation values close to zero meant weak relationship and values close to one a strong relationship.

From the table below, the results of correlation analysis revealed that engagement of local authority and ISWM are positively and insignificantly related (r=0.107, p=0.524). It also indicated that the involvement of landlords and ISWM are positively but significantly related (r=0.297, p=0.033). Lastly it indicated that national government engagement and ISWM are positively and significantly related (r=0.549, p= 0.000). This implied that increase in any unit of the variables leads to increase in ISWM.

Table 4.8: Correlation matrix

		Local authority engagement	Landlords' involvement	National government engagement	ISWM
Local authority engagement	Pearson Correlation	1	.564**	.309	.107
	Sig. (2-tailed)		.000	.059	.524
	N	38	38	38	38
Landlords' involvement	Pearson Correlation	.564**	1	.037	.297
	Sig. (2-tailed)	.000		.824	.033
	N	38	38	38	38
National government engagement	Pearson Correlation	.309	.037	1	.549**
	Sig. (2-tailed)	.059	.824		.000
	N	38	38	38	38
ISWM	Pearson Correlation	.107	.297	.549**	1
	Sig. (2-tailed)	.524	.070	.000	
	N	38	38	38	38

Correlation is significant at the 0.01 level (2-tailed).

4.5.2. Regression analysis

The results in table below represent the summary model used in regression explaining the study phenomena. Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in independent. The three independent variables studied (local authority engagement, landlords' involvement, and national government engagement); explain only 45.6% of ISWM in Machakos County. Meaning other factors that are not studied contribute to 54.4% of ISWM.

Table 4.9: Model Summary

Model	R	R Square	Durbin-Watson
			Sig. F Change
1	.675[a]	.456	.000

a. Predictors: (Constant), national government engagement, landlords involvement, local authority engagement
b. Dependent Variable: ISWM

4.5.3. Analysis of variance

The p-value in statistics significance test indicates the relation of independent variables to the dependent variables. If the significance number is less than the critical value (p) which is 0.05, then it will be concluded that the model is significant in explaining the relationship. Table 4.9 provides results do analysis of variance (ANOVA). The results indicated that the model was statistically significant and that the independent variables are good predictors of ISWM as supported by F statistics of 5.697 and p value (0.000) which is less than 0.05 significance level.

Table 4.10: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.296	3	12.099	9.507	.000[b]
	Residual	43.270	34	1.273		
	Total	79.566	37			

a. Dependent Variable: ISWM
b. b. Predictors: (Constant), national government engagement, local authority involvement, landlords' involvement

4.5.4. Regression Coefficient

Regression of coefficients results in table below indicated that, in regards to local authority engagement, B=-1.135 and p-value= 0.034. Since p is less than 0.05 there is level of significant. Therefore it can be concluded that local authority engagement relationship is negative but significant can be used as predictor of ISWM. Landlords' involvement was tested and from the results B= 1.182, p= 0.004. Since p is less than

0.05 there is level of significance. Therefore it can be concluded that the relationship between landlords' involvement and ISWM is positive and significant. Lastly in National government engagement, the results it indicated that B=1.644, p=000. Since p is less than 0.05 there is level of significance. This implies that the relationship between National governments' engagement is positive and significant and therefore it can be used as predictor to ISWM.

Table 4.11: multiple regression model

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.823	1.609		-1.754	.088
	Local authority engagement	-1.135	.514	-.360	-2.206	.034
	Landlords involvement	1.182	.386	.476	3.064	.004
	National government engagement	1.644	.345	.643	4.760	.000

a. Dependent Variable: ISWM

From the data regression equation was established:

$Y= -2.823+-1.135+ 1.182\ x_2+1.644x_4+\boldsymbol{\varepsilon}$

The model show that national government engagement has a positive coefficient which implied it was directly proportional to ISWM. This means that an increase in a unit in landlord involvement and national government will increase ISWM with 1.182 and 1.644 units respectively. Similarly, a change in local authority engagement unit will result to a decrease in ISWM by 1.135 and with all independent variables held constant there will be a decrease ISWM by 2.823 units.

In conclusion the inferential statistics implied that ISWM was explained by the independent variables; local authority engagement, landlords' involvement and National government engagement.

CHAPTER 5: SUMMARY OF FINDINGS, DISCUSSIONS AND CONCLUSIONS AND RECOMMENDATIONS.

5.1. Introduction

The summary of the findings is presented here together with conclusion and recommendation for the study.

5.2. Summary

The objectives of the study were as follows; to establish the effect of local authority engagement in successful SWM in Machakos County, and; to find out the effect of landlords' involvement in successful SWM in Machakos County. Others are to determine the effect of NGOs' engagement in successful SWM in Machakos County and to find out the effect of national government engagement in successful SWM in Machakos County. Most of the respondents were in the age bracket of 26-59 years, indicating that majority of them are mature and with considerable experience to understand the effects of successful engagement among the waste management stakeholders within Machakos County Indeed, this is the age group of most employees, both in the offices and the field areas where solid waste collection is done. Additionally, most managers of the residential units fall within this age bracket.

In terms of gender, it is evident from the data that in spite of the females being more, there is no significant variation from that of the male. Nonetheless, the results indicate that the county has more female employees in the departments charged with the management of solid waste. Within the offices, most of the staffs are either graduate with Bachelor's degree or diploma. Indeed, it in the environment department where most of the workers have secondary as their highest level of education. It is imperative to note that those at the management level are holders of higher education some having Maters Degree and it is therefore expected that they should have good

managerial skills that result in effective engagement with other stakeholders' in SWM.

Although respondents have experience of less than five year, a good number as indicated by the data have been here for 10-20 years thereby giving them more capacity to initiate and have knowledge about successful stakeholders engagement in SWM. Observably, education level and experience played a key role in understanding the need for successful engagement among stakeholders. Indeed, those with bachelor's degree and have worked in a department for more than five years, had better understanding of the roles each stake holder is supposed to play, and objectively rated the performance. For instance, they were able to understand the prospects of integrated sustainable SWM, in terms of its efficiency, reliability and effectiveness in achieving successful stakeholders' engagement in SWM.

5.3. Discussions

Under each objective a number of variables essential to successful engagement among stakeholders were tested among the respondent. The outcome of the response is discussed as follows;

5.3.1. Local Authority Engagement in Successful SWM.

Observably, there is general inefficiency in the management of the solid waste within Machakos County. Particularly, this is well captured within the response as there is a general low mean marking the level of Local authorities' engagement in the soil waste management. Observably the findings of lack of successful engagement of the local authority points to lack of adequate managerial approach as provided under stakeholders theory of management. One way of gauging the efficiency of the management is the cost effectiveness with which the services are conducted. Most

respondents are either not sure or disagree that there is cost effective way of SWM within Machakos county; thereby indicating lack of accountability and transparency in the operations of the departments. According to (Freeman and Philip, 2012) this is a sign of poor management since there is no balance between various stakeholders such that developed relationship can impact on organizational goals.

Besides, it reflects poor adaptation to resource dependency as espoused by (Davis & Adams, 2010). Notably, resource dependency require that organizations work together to engage each other to achieve resource efficiency. The situation is made worse by the fact that not all private actors within the waste management system are licensed; hence, manager of various departments and organizations work in isolation. Observably, there is no strategic out sourcing of services as a remedy under resource dependency theory of management (Najeeb, 2014). The general outcome is unsuccessful engagement of the departments under the local authority.

5.3.2. Landlords' Engagement in Successful SWM.

The landlords are at the main center of successful SWM within the county for the reason that the generation occur at the household level. Therefore, it is envisioned that an effective engagement of the landlord with other agencies with responsibility under this sector, will go a long way in bringing in Integrated Sustainable SWM in the County. However, the results of the study indicate a general lack of successful engagement of the landlord in the SWM and the landlords equally do not engage their tenants. Notably, the study points to lack of networking among stakeholders as provided by (Sciarelli & Tani, 2013). Most towns in Kenya are rapidly urbanizing with dynamic cultural and political aspects as observed by (Marshall & Farahbash, 2013). Therefore, this rapid urbanization puts the Landlords; who are the managers at the housing level at a strategic role in achieving successful SWM.

However, that is not the case currently as indicated by the results. For instance, there are no safe and accessible waste storage points in most estates that took part in the study. Consequently, this means there is no designated collection point, and indication that the wastes especially in housing units of Mlolongo and Athi-River, disposing their solid wastes haphazardly. If there were good engagement of the landlords and tenants as key stakeholders within the SWM, then there would be good management within household level with segregation of waste. Indeed, this would include managers employing network approach to overcome obstacles for achieving ISWM. But, the current information indicated divergent goals occasioned by limited interactions among stakeholders. Indeed, this is strengthened by loose connections among the departments leading to limited control in the information and resources flow from one stakeholder to the other. Hence; the results clearly demonstrate lack of successful engagement of the landlords by other agencies responsible for SWM like the local authority.

5.3.3. National Government Engagement in Successful SWM.

The National Government agency in the SWM is NEMA. Generally, the agency has supervisory role and development of the policies used by stakeholders in the management of solid waste. Under this objective, the results indicate that there are laws to support successful engagement in SWM among stakeholders. Indeed, this is the only objective with mean above 3.00 based on the variables that were evaluated. Largely, this is due to the institutional management approach that the National Government has adopted towards SWM within Machakos County. For instance, NEMA understands organization and management practices as products of social rather than economic pressure. Therefore, it has been able to establish organizational behaviors that defy economic realities (Berthod, Growth –Hammer & Sydow, 2017).

Additionally, the National Government has in place resource dependency strategies that help in out sourcing services and instituting collaboration among stakeholders. As indicated by Freeman and Philip, (2002), this is responsible for the balance of various SWM issues in the County.

In spite of this illustrative successful engagement of the national government, other significant stakeholders within the SWM system such as the local authority and the landlords are yet to adopt effective management strategies that would lead to general success.

5.4. Conclusion and Recommendations

5.4.1. Conclusions

There is general lack of stakeholders' successful engagement in SWM within Machakos County except the National Government; which has demonstrated considerable success in its role. Observably, this is due to poor organizational management strategies within the institution concerned. For instance, there is poor or inadequate communication among the stakeholders, in spite of finances being available. Besides, there are no engagement strategies among the local authority and landlords due to poor organizational management within the departments. The existing laws and best coordination strategies are not communicated due to absence of NGOs within the County to do advocacy. The landlords on the other hand would want to cut cost in their management while the public have general poor attitude towards solid waste. If not well supervised with successful engagement, then the outcome is poor management of solid waste within the County

5.4.2. Recommendations

Local Authority

Local authority should explore the prospects of Integrated Sustainable solid waste, management which is the approach proposed by the natural resources managers to take the interest of the stakeholders. This approach enables the system to be inclusive, represent the full spectrum of recognized as well as unrecognized stakeholders and be financially sustainable, employ skilled personnel or train the existing ones on communication and collaboration with stakeholders in SWM, educate the public on the essence of solid waste separation at the source before disposal, employ SWM hierarchy (reduces, reuse, and recycle) and lastly, enhance collaboration among the departments relevant in the effective SWM within the county.

Landlord

The landlords should designate solid waste collection point, to make it easy for disposal and facilitate efficient collection of the waste, ensure that the disposal sites are closed and protected from wind, and pests, create awareness among the tenants to adopt waste hierarchy

National Government

The National Government should work with the local authority on strategies to enhance coordination with all stakeholders tasked with solid waste, management, enhance their supervisory roles over other agencies with the responsibility in SWM, encourage Non -Governmental organizations and community based groups to focus on education, awareness, and advocacy on issues of SWM, educate the public and institutions on various laws and policies dealing with the management net of solid waste.

5.5. Areas for further studies

A study should be conducted to find out why NGOs are not interested in the successful SWM within Machakos County.

The issues of inadequate SWM are not unique to Machakos County. Therefore, a similar study should be conducted in other counties within the Republic of Kenya to ascertain if the same results can be achieved.

A study should be carried out to establish why there is a general lack of coordination between employees and departments tasked with SWM.

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APPENDICES

APPENDIX I: LETTER OF INTRODUCTION

Dear Sir/Madam,

RE: ACADEMIC RESEARCH PROJECT

I am a Postgraduate student at The KCA University pursuing a Master's Degree in Business Administration (corporate management). I wish to conduct a research on "**Role of Stakeholders in successful SWM in Machakos County".** I am kindly requesting that you grant me permission to collect information on this important subject.

Please note that the information you provide will be treated confidentially and will only be used for academic purposes. Ethics will be observed to ensure confidentiality and the study outcomes and reports will not include reference to any individuals.

I immensely appreciate your consideration and contribution towards the success of this study.

Yours Sincerely

Christine MusyawaNdonye

APPENDIX II: RESEARCH STUDY QUESTIONNAIRE

I am conducting a research on "**Role of Stakeholders in successful SWM in Machakos County"**. This research is purely for academic purposes. I kindly request you to cooperate and fill out the questionnaire which seeks your views on this issue. The information that you give shall be treated confidentially and will only be used for academic purposes.

Tick your appropriate answer.

SECTION 1: GENERAL INFORMATION

1. Gender
   1) Male [ ]
   2) Female [ ]
2. Age of the respondent
   1) Below 25 years [ ]
   2) 25-35 years [ ]
   3) 36-45 years [ ]
   4) 46-55 years [ ]
   5) Above 55 years [ ]
3. level of education
   1) Primary education [ ]
   2) Secondary education [ ]
   3) Certificate [ ]
   4) Diploma [ ]
   5) Bachelor's degree [ ]
   6) Master's degree [ ]
   7) Other (specify)……
4. Department/estate……
5. For how long have you in your worked/lived in this department/estate respectively
   1) Less than 5 years [ ]
   2) 5-10 years [ ]

3) 11-20 years [ ]

4) Above 20 years [ ]

SECTION 2: The effect of Local Authority's Involvement

6. The following table indicates statements regarding the extent at which the Local Authority (County Government of Machakos, Environment department, Lands, and public health), are involved in SWM. Indicate the extent to which you agree or disagree with each statement by ticking on the appropriate column, using the scale below.

   1-(Strongly Agree), 2-(Agree), 3-(Not Sure), 4- (Disagree), 5- (Strongly Disagree)

Statements	**1**	**2**	**3**	**4**	**5**
There is reliable collection of solid waste in Machakos County					
There is safe disposal of Solid waste within Machakos County					
The transportation of solid waste within Machakos County is cost effective					
All private actors in SWM are licensed					
There is compliance with SWM laws and regulations within Machakos County					
There is designated land meant for dumping solid waste within Machakos County					
There is adequate enforcement of SWM regulations and laws at household level.					

Section 3: The effect of Landlords' Engagement

7. The table below indicates statements regarding the Landlords role and the level of their engagement within the SWM within Machakos County. Indicate the extent to which you agree or disagree with each statement by ticking on the appropriate column, using the scale below.

   1-(strongly Disagree), 2-(Disagree), 3-(Not Sure), 4- (Agree), 5- (strongly Agree)

Statements	**1**	**2**	**3**	**4**	**5**
There a safe and accessible waste storage point/collection site within the resident					
The neighborhood is not littered with solid waste					

Tenants dispose waste at the designated collection point					
All waste is collected from the designated storage point					

SECTION 4: effect of NGOs' Engagement

8. The table below indicates statements regarding the role of NGOS in SWM within Machakos County, and the extent at which they are engaged. Indicate the extent to which you agree or disagree with each statement by ticking on the appropriate column, using the scale below.

1-(strongly Disagree), 2-(Disagree), 3-(Not Sure), 4- (Agree), 5- (strongly Agree)

Statements	**1**	**2**	**3**	**4**	**5**
There is accountability within the SWM in Machakos County					
There is transparency within the SWM in Machakos County					
There is enough resources to support sustainable SWM within Machakos County					
There is adequate awareness and information about SWM within Machakos County					
There is reliable linkage and engagement of stakeholders within the SWM within Machakos County.					

SECTION 5: The effect of National Government' Involvement

9. The table below indicates statements regarding the national government's involvement in SWM and effectiveness of that involvement. Indicate the extent to which you agree or disagree with each statement by ticking on the appropriate column, using the scale below.

   1-(Strongly Agree), 2-(Agree), 3-(Not Sure), 4- (Disagree), 5- (Strongly Disagree)

Statements	**1**	**2**	**3**	**4**	**5**
There is adequate policy by the National government to support effective SWM					
There are adequate regulations by National Government agency like NEMA to support SWM					

There is inadequate enforcement of the regulations and laws on SWM					
There is inadequate financial allocation for SWM					
There is adequate security within areas designated for solid waste sites.					
There is a clean and healthy environment free from Solid waste nuisance and hazards.					
The National government is adequately engaged by the local authority in SWM					

SECTION 6: Integrated Sustainable SWM (ISWM)

5. The table below indicates statements regarding the prospect of an integrated sustainable SWM within Machakos County. Indicate the extent to which you agree or disagree with each statement by ticking on the appropriate column, using the scale below.

1-(strongly Disagree), 2-(Disagree), 3-(Not Sure), 4- (Agree), 5- (strongly Agree)

Statements	**1**	**2**	**3**	**4**	**5**
ISWM improve management within institutions charged with SWM within Machakos County					
ISWM will bring accountability in resource s management among institutions charged with SWM in Machakos County					
ISWM will promises efficiency among the institutions responsible for SWM within Machakos County					
ISWM will lead to best strategy of SWM among the institutions and individuals responsible within Machakos County. Desirable waste hierarchy(Reduction, Reuse, Recycle)					

APPENDIX III: RESEARCH STUDY WORKPLAN

ACTIVITY		July- August 2018	Sept- Oct 2018	October 2018
1.	Proposal Write-Up And Presentation			
2.	Preparation Of Research Tools			
3.	Pilot Study			
4.	Field Work (Data Collection)			
5.	Data Entry And Analysis			
6.	Project Write-Up			
7	Project Submission			

APPENDIX IV: RESEARCH BUDGET

ITEM	**AMOUNT**
STATIONERY	15,000
PHOTOCOPYING	10,000
SECRETARIAL SERVICES	6,000
TRAVELING EXPENSES	20,000
SUBSISTENCE	5,000
BINDING	6,000
INTERNET	7,500
MISCELLANEOUS EXPENSES	5,000
TOTAL	**54,500**