

**Evaluating the Effectiveness of the Waste Management Regulation, Legal Notice 121, 2006,
in Relation to Solid Waste Management in Kiambu Town, Kenya**

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Environmental Governance

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Declaration

I declare that this research report is my own work. It is submitted in the partial fulfillment of the requirement, for the Masters of Science in Environmental Governance, University of Nairobi. It has not been submitted before for any program or examination in any other Institution. I further declare that I obtained the authorized consent to carry out this research.

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Dedication

I dedicate this project to the Almighty God, the main source of aspiration, knowledge, and wisdom. I also dedicate the work to my dear wife; my father and other very close family members who have encouraged me all the way to ensure that I have all what it takes to finish the thesis document. In addition, I also thank my son who gave a humble time to quest this educational thirst. Thank you all for your support and may the Lord bless you abundantly.

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Abbreviations and acronyms

EMCA - Environment Management and Coordination Act

MENA - Ministry of Environment and Natural Resources

NEMA – National Environment Management Authority

UNEP – United Nations Environmental Program

SWM – Solid Waste Management

NSP – National Strategic Plan

WHO – World Health Organization

WMR – Waste Management Regulation

ISWM - Integrated Sustainable Waste Management

IT – Institutional Theory

CGK–County Government of Kiambu

OECD - Organization for Economic Co-operation and Development

Abstract

The study evaluated the effectiveness of the Waste Management Regulation (Legal Notice No. 121, 2006) within Kiambu town. Indiscriminate solid waste disposal is one of the salient environmental problems in developing countries. Such challenge has been attributed to the incapacity of the existing legal frameworks to regulate the escalating poor waste disposal practices among other factors. The Legal Notice No. 121, 2006 was enacted to regulate waste disposal activities within the country, Kenya, under the Authorities of Ministry of Environment and Natural Resources (MENR) and National Environment Management Authority (NEMA). To assess how effective this regulation was, the study hypothesized that this regulation was effective in Kiambu Town. Through the Compliance Theoretical Framework, the study adopted various indicators, which also formed the research objectives used to assess the overall effectiveness of this public law, these include; capacity to solve disputes, stability, public awareness, consistency, participation of the National Government through NEMA, County Governments and involvement of the public, as well as, level of enforcement by the relevant authorities. The study used a survey research design to collect data from the public, Kiambu County Government environmental personnel and NEMA officials through questionnaires and interviews – using a sample of 100 participants. Data collected was analyzed using SPSS Software version 20. The study revealed that the community had very limited awareness of the law and of the role of the County Government and National Governments towards enforcing the law, while the involvement of NEMA was not sufficient. Thus regulation was found to have a poor enforcement level, it was incapable of solving disputes as expected, and public participation was poor towards supporting the law. However, the law was stable and was not influenced by other legislations from the other sectors. Overall, the law was ineffective – and this implicated that the town needs government attention to increase the public awareness of the law, engage the public in acceptable solid waste management practices, increase waste collection resources, and work jointly with the judiciary towards proper enforcement of the law.

Key Words: Legal Notice No. 121, Solid Waste Management, Kiambu Town

CHAPTER ONE: INTRODUCTION

1.0 BACKGROUND

Solid Waste management in the developing countries has been a focal challenge that remains unsolved following several constellation forces of economic growth, legislations, and unsupportive societies. Ideally, many of the societies in these developing countries neglect environmental threats and concerns to an extent that little or no care is fostered towards sustainability resulting to massive environmental pollution and degradation of public health. Solid waste has become a major threat and a concern to the quality of the environment in many developing nations because of improper and unsound collection, transportation and disposal methods used (Hwa, 2007). Such an aspect leaves a room for questioning the effectiveness of the existing legal frameworks enacted to govern, regulate and control waste disposal in these countries.

Waste is defined as any matter whether liquid, solid, gaseous or radioactive, which is discharged, emitted or deposited in the environment in such volume, composition or manner likely to cause an alteration of the environment (Cap 387-EMCA, 2015). Liquid waste (effluent discharge) is captured under the Water Quality Regulation, 2006, Gaseous emissions are captured under Air Quality Regulation, 2014 while radioactive waste is captured under the Radiation Protection Act, Cap 243, however for the purpose of this research, the study focused on solid waste.

countries.

A study done in India claimed that, despite the existence of these legal frameworks, the environmental problems associated with unsustainable solid waste disposal still persist, claiming that such problems are embedded in the manner in which such legislations are formulated and implemented (Joardar, 2000). Based on the claims, many of the environmental laws remain

unknown to the public while others are constrained by poor structural capacities, inconsistencies in enforcement, and instabilities caused by frequent modifications to suit changes within operational frameworks of local and state governments (Thomas, 2008).

In the Kenyan context, an environmental law was formed: The Environment Management and Coordination act (EMCA), 1999 that aimed at addressing environmental concerns. Subsequently a subsidiary regulation under EMCA, 1999 known as the Waste Management Regulation, 2006 was enacted with the specific aim of addressing all matters of solid waste management in Kenya. The Waste Management Regulation, 2006 focuses on waste generators; waste transporters; waste treatment facilities and waste disposal facilities (UNEP, 2006). Nevertheless, the current state of affairs is quite contrary to what the regulation requires because solid waste management persistently remains to be a problem of both National and County Governments.

With this regulation in mind, poor solid waste management is still happening despite the number of policies and legislation already in place to govern the sector. In accordance with the Constitution of Kenya, 2010 the County Governments are required to adopt and adhere to the National set standards and laws and domesticate these laws where necessary within their jurisdiction in respect to the Waste Management Regulation, 2006. In the same respect the County Governments as are required by law to strictly adhere to the waste management regulation in order to promote and ensure that solid waste is properly and adequately managed.

Despite the fact that waste management remains to be a devolved function, the County Governments have still not yet prioritized to establish appropriate and acceptable waste management systems that comply with the waste management regulation, 2006 in order to

address the constant concerns within the waste sector. Some of these concerns include: indiscriminate dumping, uncollected waste, lack of proper segregation, poor waste transportation systems and lack of adequate and designated disposal sites (Karanja, 2005).

1.1 Problem Statement

In Kenya waste management is a devolved function. This places a huge role on the County Governments in ensuring environmental sustainability. The fourth schedule of the Constitution of Kenya, 2010 part 2 (2.g) provide that County Governments shall be responsible for refuse removal, refuse dumps, and solid waste disposal. The county governments are required by law to comply to the waste management regulation in order to ensure sound management of waste but the current state of affairs bring out the question as to why such a law is not making much difference in the quality of the environment. Despite the existence of the waste management regulation (2006), Kenyan urban cities are identified by massive indiscriminate solid waste disposal which has led to unsustainable lining environments (Karanja, 2005) & (Sharholly, et al.2008).

Such an aspect leaves room to examine how effective the environmental legislations are subject to the existing status quo of the solid waste levels within the Country. Specifically, Kiambu County does not have any existing laws regarding solid waste disposal, however, it adopts various county-level by-laws that assist in managing solid waste collected by the county garbage collectors such as dumpsite maintenance and dumping rules. Tentatively, the county has heavily relied on the Legal Notice 121, of 2006 which was implemented to oversee and regulate solid waste across the country – it is a national level law.

1.2 Main Objectives

To evaluate the effectiveness of the waste management regulation in Kiambu Town in relation to the residents (small business owners) and the County Government of Kiambu.

1.2.1 Specific Objectives

1. To investigate the level of awareness of the Waste Management Regulation (WMR), 2006 in Kiambu town.
2. To evaluate acceptability of the waste management regulation by the community in Kiambu town as well as the County Government of Kiambu.
3. To determine the compliance and enforcement levels of the waste management regulation in Kiambu town.
4. To assess the stability of the regulation in Kiambu town in relation to the changes that occurs in society.
5. To assess the consistency of the regulation in relation to its implementation in Kiambu town.

1.3 Research Questions

1. What are the awareness levels of the community members in Kiambu town in relation to the WMR, 2006?
2. To what extent has the WMR, 2006 been accepted by the community members in Kiambu town?
3. Who is responsible for the enforcement of the waste management regulation in Kiambu town?

4. How does the regulation provide dispute resolution mechanism in regards to solid waste management conflicts in Kiambu town?
5. What mechanisms are put in place to ensure that the WMR, 2006 is consistently implemented in Kiambu town?

1.4 Hypothesis

The Waste Management Regulation, 2006 (legal Notice 121) is effective in Kiambu town. This is a working hypothesis that was adopted to test and confirm the effectiveness of the regulation in question.

1.5 Justification

As the county governments face solid waste management challenges, this study opened a chance for the key stakeholders at the National and County level to understand the issues surrounding solid waste management within Kiambu town and the possible potential solutions (evidence-based solutions) that such an urban area can implement to encounter unsound waste management challenges and prevent environmental pollution issues. Through this approach, the County Assembly of Kiambu would re-evaluate their existing environmental legislation, modify and amend to suit the structural capacity of the Sub-County. For instance, it will create an opportunity for the county government to establish an environmental by-law on solid waste management where there is none; conduct legal campaigns that focus on creating awareness of existing and new laws at the county-level as well as the educate the masses on National legislations that are geared towards sustainable solid waste disposal and management.

Further, the study findings identified if the current laws override the community values and rationalize the need to match the values of the community with the demands of these

legislations. Notably, this tells that the County Government has an opportunity to identify the level of acceptability of the Legal Notice No. 121 within the Kiambu town and the appropriate modifications that can be established to encounter the hindrances towards successful enforcement. Further, the study deemed the existing law relatively unstable and the county legislators can be able to identify the main approaches, as recommended by the study, to make the appropriate modifications that allow stability in their enforcement process.

The County Government of Kiambu has an opportunity to understand the degree and extent in which they have complied to the Waste Management Regulation (WMR), as well as, find out the technical and structural gap in terms of technology and planning mechanisms that should be considered in order to effectively manage solid waste in accordance to the environmental principle enshrined in Kenya Constitution, 2010 and to achieve sustainability for the residents of Kiambu town.

1.6 Scope of the Study

The study focused on investigating the effectiveness of the Legal Notice No. 121 (2006) on solid waste management in Kiambu town. Major key indicators that the study focused on include the law acceptance by the public and authorities, capacity to solve disputes, stability (influence by other legislations), participation by the County authorities and the public, consistency in its application, and the level of involvement by National Government (NEMA).

1.7 Study Limitations

The study was limited by three major problems, which had implications on the data collection process though they did not compromise its findings and the quality of analysis. First,

mobilizing the study participants was a salient challenge. The researcher took long to reach out to all the potential study subjects together in place. Tentatively, the study involved data collection through the use of interviews and questionnaires. Data collected through the questionnaires targeted the general public while the interviews targeted the officials in the environmental docket within the County Government of Kiambu and NEMA. Due to the tight schedules of the officials, it was hard to carry out the 20 interviews in the planned timeframe – some respondents kept rescheduling the interview meetings. There was a high non-response rate from the general public and it took time to have all the questionnaires filled and collected.

Time as a resource was a challenge too. For instance, collecting all data rolled over the speculated and planned timeframe. The questionnaire and interview instruments included qualitative questions that aimed to get more insights. Analyzing, grouping, and summarizing all the responses into different themes took longer than the scheduled time – although it did not influence the timeframe for writing the draft. Lastly, the study did not adopt a balanced sample for the general public and the County environmental officers. Such an aspect tells that more weight was given to the general public than the county officials. A problem arising with the imbalance was reflected with the responses because the public evaluated all the indicators assessing the law as negative while a higher number of county officials gave average ratings. Perhaps the county environmental officials had more information about the law – though all the participants gave significant insights depending on the status quo of the solid waste management, which allowed the researcher to draw conclusions on the level of effectiveness.

1.8 Research structure

The chapter one of this research proposal identifies the background and statement of the research problem, as well as, highlighting the research objectives and questions guiding the research work. The chapter two reviews literature by various scholars on the effectiveness of environmental laws across the globe; criteria used to assess effective laws; and the research gaps that needs to be filled, as far as, effective solid waste management legislation is concerned. The chapter three of the proposal details the roadmap of the methodological approaches that facilitated the data collection, measurement and analysis to answer the research questions. Lastly, the bibliography section outlines the scholarly sources cited in the study, as well as, those referred in formulating the research conceptual framework.

CHAPTER TWO: LITERATURE REVIEW

This chapter reviews extant literature in seven sections as follows:

2.1 Solid Waste Management global perspective

Solid Waste Management (SWM) has been a critical concern in many countries with several scholars shedding light on the issues revolving around it. The major driving forces for SWM includes the rapid population growth, affluence, consumption and technology (Hwa, 2007). Globally, comparing national or regional municipal SWM statistics is challenging due to varying methods, units, definitions and time of data collection. Almost in every country, the County Governments/local authorities are identified as semi-autonomous and statutory institutions which represent the national governments and imparted with the legal responsibility to provide urban services, solid waste management, and sanitation (Zerbock, 2003). For instance, one of the main approaches that many countries adopt to manage solid waste is through legislation – which typically involves implementing local statutory laws regulating waste handling, transportation and disposal.

These laws are meant to minimize and eliminate uncontrolled disposal that would pollute or degrade the environment to an extent that is likely to cause harm to both biological and ecological systems. However, solid waste generation has been increasing disproportionately particularly in the developing countries. Guerrero added that considering the Organization for Economic Co-operation and Development (OECD) countries, solid waste continues to increase in per capita and absolute terms (Guerrero et al. 2013). According to UNEP SWM is a concern in developing countries regarding to their daunting problems which to a big extent are due to inability of the local and national responsible sectors to address this issue effectively (UNEP,

2005). Such an aspect translates to the idea that legislation of SWM is an issue in many countries and this study focuses on diving deeper to assess the effectiveness of solid waste regulation with a case study of Kiambu town, Kenya – which is typical a potentially growing residential and urban area.

2.1.1 Indicators of an effective legislation

A report by the Law Society of Australia focused on the conventional indicators of effective legislations that are used as benchmarks in assessing and evaluating laws (The Law Society of Australia, 2015). According to the report, effective laws should be known and acceptable by the community they are meant to regulate. Ideally, the government should do whatever it takes to create public awareness of the set regulations to avoid ignorant excuses by law breakers. Equally, it becomes hard for the public to follow laws that they are not aware of – indicating that the law makers have the exclusive role of informing the public of any new laws and subsequent changes made on these laws (The Law Society of Australia, 2015). Still, the laws should be acceptable in the community (In Simelane et al. 2015). Such an idea tells that the laws should be a reflection of the values of the community and not give room to override any of the values for optimal conformity by the public. The report adds that, the laws should be enforceable so that it can effectively become operable – indicating that it has to give the room to identify the non-conformers and law-breakers and bring them to justice.

Considering the existing laws and policies within a country, any laws newly formulated should be stable and not stand a chance to override the existing ones so as to avoid chances of frequent modifications (Pinderhughes, 2004). A stable law should be free from constant changes to minimize chances of public confusion when it comes to compliance. From an environmental

standpoint, legislators have the role of making the law clear and instil the public with the certainty that the law is reliable. However, it should not be rigid in a way that it cannot accommodate changes in the community value. Such flexibility makes laws to change as new community values develop or change and give legislators an ample time to adjust the law accordingly (Mayda, 2005). Environmentally, as the global community advocates for going green, the existing laws should stand a chance to embrace such changes.

Consistency is another critical factor that influences the effectiveness of any public policy laws. Laws that apply differently across to different social groups or individuals, or even manipulated discriminately across different individuals are inconsistency and ineffective. Environmental laws in many developing countries are inconsistency due to the fact that pollution policies allow breaking the laws at varied expenses such as through permits and penalties that are not standardized (Mayda, 2005). Ideally, some economical units are allowed to pollute to certain varied limits – such an aspect shows some inconsistency that violates the effectiveness of the law. Lastly, as seen with the potential occurrence of disputes within the environmental setting, the existing laws need to have the capacity to address these disputes, timely and efficiently. Laws that do not address the arising disputes stand a chance of destabilizing the functioning of the community. A good example may be seen with conflicts that arise with dumping sites; the law should come up and solve such disputes and restore confidence of the community.

2.1.2 Effectiveness of SWM regulation in developing countries

Despite the mandate of regulating municipal waste, the local authorities face various challenges which deem their regulatory frameworks ineffective. Environmental laws are not always efficient and effective, a key aspect that the author attributes to improper resource

management and lack of financial support from the national government (Nadzri et al. 2012). Studies by Marshall and Farabakhsh and Simelane and Mohee argue that in many of the developing countries, environmental regulatory policies and laws do not make a difference since many of these laws do not consider the needs of the individual country – translating to the idea that many of these legislations are perceived as potential or significant setbacks towards sustainable growth (Marshall et al. 2006) & (Simelane et al. 2015). Marshall and Farabakhsh also suggested that, the drafting and implementation of these environmental laws in these countries need special attention particularly to consider the feasibility, plausibility, and side effects of the laws – to assess their effectiveness before implementation – indicating that they should conform to the societal values (Marshall et al.2006). Still, policy makers to these laws need to reconsider their conceptual framework and practical implications of such laws regarding the efficacy of addressing the environmental challenges.

Srivastava, added that the chief problem with these legislations in many of these countries are structural constraints which deem many of their environmental laws unstable (Srivastava et al. 2015). The study added that the laws should not be understood as new systemic rules; rather they should be addressed as a component of eco-management or a sustainable eco-systemic approach of resource management which is progressively implemented for economic development. Several environmental issues such as failure to manage solid waste has been associated with fewer resources to support and enforce the laws passed by the municipalities (Marshall et al. 2006). Marshall and Farabakhsh evaluated the effectiveness of legal framework in managing solid waste in Malaysia subject to its National Strategic Plan (NSP) (Marshall et al. 2006). The study found that the existing laws were majorly influenced by the overriding agency

policies that subjected the laws to continued changes which made them ambiguous to follow by the business units. Further, Iskandar and Ezeah et al. assessed the effectiveness of local environmental laws in Tanzania and Nigeria respectively (Iskandar, 2003) & Ezeah et al. (2010). The studies showed that one of the major challenges that hampers effective legislation of solid waste is poor public support which emanates from lack of awareness of the scope of the existing laws.

Waste management in Kenya is identified by uncontrolled dumping, poor or lack of solid waste management control framework, unregulated private sector participation, ineffective recycling and recovery industry, as well as, lack of proper waste policies (UNEP, 2006). At least 61% of the solid waste in urban areas comes from residential areas with 21% coming from industrial activities. However, there have been illegal and unregulated dumpsites which emerge along the roads, commercial premises and residential backyards – particularly in the urban areas (UNEP, 2006). The EMCA of 1999 provided the establishment of appropriate institutional and legal framework for the management of environment with its section 87(4) prohibiting risky handling and disposal of wastes with sub-section (5) spelling out the possible consequences of solid waste management. Overall, EMCA of 1999 aimed to regulate solid waste generation from its sources (UNEP, 2006).

Act No. 8 of the EMCA established an agency to oversee waste regulation in the country – the National Environment Management Authority (NEMA) – particularly in enforcing the environmental policies in the country. Later in 2006, NEMA initiated a new waste management regulation; the Legal Notice No. 121 that aimed to focus on waste generation, transport, treatment and disposal. However, with the devolution of the Kenyan government, the mandate of the

County Government in regulating waste disposal appears a challenge because even with the existence of these legal frameworks, SWM is still in a pathetic situation (UNEP, 2006). Almost in every Kenyan town, solid waste is a concern as indiscriminate solid waste disposal becomes uncontrollable. Locally, the management of solid waste in Kiambu town falls in the hands of the County Government of Kiambu, which works under supervision from NEMA to provide a regulatory framework and services geared towards a sustainable environment – free from solid waste issues.

2.2 Overview of Legal Notice No. 121

The Legal Notice No. 121 was established under the Sections 92 and 147 of the EMCA of 1999 subject to the authority from Cabinet Minister in the Ministry of Environment and Natural Resources (MENR). The notice defines several concepts as per the law and how they are related in waste management subject to Caps 243 and 346 (NEMA, 2006). The Part II of this notice gives clear provisions regarding solid waste and defines the responsibilities of the different actors within waste generation and management. For instance, it legally recognizes the responsibilities of the waste generators, accepted waste transport and disposal approaches, acquisition of licenses, proper waste treatment, and waste recycling and re-use, as well as, requirement for environmental audit. Further, any person or business unit granted a license under this Act is required by the Local Authority to operate a disposal plant or site and comply with all the conditions that the local authority imposes – to ensure that waste disposal is soundly and efficiently done (NEMA, 2015). The regulation demanded that every industrial or trade undertaking would be required to dispose and manage waste produced subject to the disposal standards spelt in regulation 26 and 47 – which classifies the waste and recommends the best disposal practices (NEMA, 2006).

2.3 Urban Areas and Cities Act in Kenya

The Urban Areas and Cities Act in Kenya of 2011 gave an effect to Article 184 of the Constitution of Kenya, 2010 that categorizes the urban cities, their governance and management, as well as, the criteria of establishing new urban areas and the role of residents in managing the cities. Ideally, one of the main considerations used to recognize a city is the capacity to functionally and effectively handle waste disposal as required by Part II section 5(h) (The Environmental Management and Coordination Regulations, 2013). Further, the city should meet the demand for delivering efficient public services such as health, electricity and solid waste management services for sustainable, healthy and safe environment as required by section 20 (q). Based on the declarations by this act, it is clear that they have a close link with the Legal Notice No. 121 enacted in 2006.

2.4 Challenges facing NEMA on SWM legislation

Several critiques have been posed on the effectiveness of NEMA's legislation towards effective sustainable environment. A critique by Sibanda et al. claimed that the Waste Management Regulation of 2006 provisions include some issues which appear to have common practices but are not compulsory (Sibanda et al. 2017). For example, development of an integrated waste management plans and reporting to the waste information systems is part of the provisions within the Act and are not compulsory – raising a concern on the consistency of the act. If the provisions are there and not compulsory indicates that some waste generating units, may file their reports while others may overlook this requirement. Consequently, such elements have led to deteriorating responsibilities to report illegal issues related to solid waste such as

illegal dumping within the urban areas (The Environmental Management and Coordination Regulation, 2013).

NEMA also lacks structural support from the County Governments such as inadequate and improper segregation, transportation, disposal methods as required by the Regulation in question. A high proportion of urban residents are not receiving waste collection facilities, and poor efforts to support or initiate recycling by county governments (Sibanda et al. 2017). Evidently, this tells that some of the laws enforced by NEMA may fail to solve several environmental disputes that may arise.

The legislation also does not spell well all the details regarding disposal of different types of solid waste such as batteries, e-waste, agricultural and building waste – a key aspect that limits public knowledge on matters related to solid waste disposal. Still, the allocation of national funds to the county governments has been identified to be a cause problem – as the counties have different pressing needs and resources – indicating that many counties are left without sufficient waste management resources (The Environmental Management and Coordination Regulation, 2013). Given the fact that Kenyan counties are disproportionately allocated national budget revenues, it is worth investigating the adequacy of such resources within Kiambu County, particularly if such funds are sufficient in supporting SWM activities.

2.5 Theoretical framework

2.5.1 Compliance Theory

The compliance theory was established by Ronald Mitchell in 2007 and focused on then actor behavior when it comes to compliance to the existing environmental laws. Accordingly, the level of commitment of agents to any environmental law is highly determined by how effective the law is in addressing the needs of the society or how the law influenced the actor behavior in terms of emitting solid waste to the environment (Ronald, 2007). Ronald adds that policies that induce challenging behavioral rules and standards discourage actors from complying with the laws enacted. Such an idea indicates that the degree of effectiveness of environmental laws depends heavily on the nature of the law and complementing policies to support it. The law recognizes two main indicators of assessing the effect of legislation influence to the public – the outputs and the impacts (Ronald, 2007). The outputs are now the regulatory policies and laws adopted to regulate the environmental issue in place while the impacts include the immediate effects or changes realized after enforcing the law or policy.

Ronald adds that if the changes or effects are undesirable – environmental improvement is not sufficient or there is no environmental improvement – then the legislators have to adopt different outputs (laws and policies) since the existing once are incapable or ineffective to address the environmental issue (Ronald, 2007). The environmental actors in this model are the states, individuals, corporations – the legislators are the state or government agencies while corporations and individuals are the polluters. Both these types of actors are guided by two behavioral logics – the logic of appropriateness and logic of consequence. Polluters' compliance is subjected to the logic of consequences while the legislators are bound by the logic of

appropriateness (effectiveness) when addressing environmental issues (Ronald, 2007). This model can be expanded further to explain the conceptual framework of this study.

2.6 Conceptual framework

Based on the compliance theory by Ronaldo Mitchell, this study focuses on solid waste legislation as the main environmental problem being addressed. As the model recognizes actors based on two levels, the study treats the general public and corporations as the compliant actors while NEMA and the County government of Kiambu as the implementers of the law. They are also closely linked to the legislators within National and County assemblies who enact the environmental laws and policies. The outputs by the legislators include the Legal Notice No. 121 that was enacted under EMCA, 1999 and county-legislated environmental policies towards solid waste management. The impacts with problem entail the immediate effects which can be claimed to be caused by the law or policies while the effectiveness is determined if the impacts are desirable or not. However, this approach does not explain the rationale why the laws or policies are not effective; therefore, the study integrates this model with the suggestions made by the Law Society of Australia on the indicators of an effective law: stability, enforceability, public knowledge, acceptability, consistency, changeability, and the capacity to resolve disputes (Law Society of Australia, 2015).

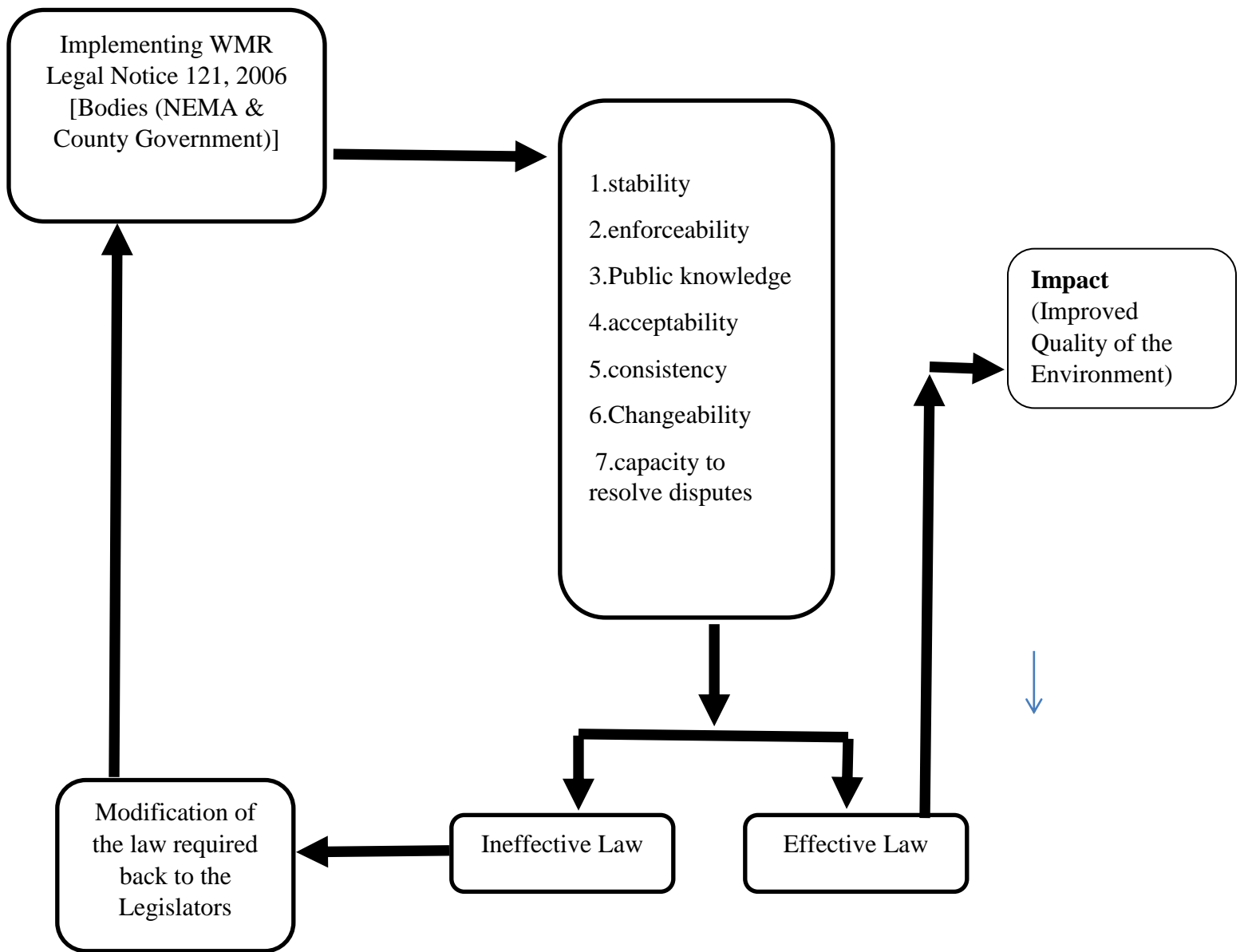


Figure 2.1: *Conceptual Framework (Author).*

2.6.1 Applicability of the Model

The Compliance Theory by Ronaldo Mitchell adopted in this study integrates various indicators of an effective law suggested by Law Society of Australia in evaluating the effectiveness of the Legal Notice 121, 2006 in Kenya – with a case study of Kiambu town. Typically, the model is applicable since it was exclusively established to evaluate international environmental agreements – indicating that it is relevant in this study. Additionally, the model relates to different environmental actors and how they are influenced by the law. In other words, the models specifically focused on assessing how environmental changes vary with the law – whether such changes involved compliance with the law regardless of whether the law was desirable or not to the actors – and if the changes were effective or not in curbing the environmental challenges facing a particular nation. Therefore, a similar situation is faced in the Kenyan context; i. There is a particular agreement (law) regulating the waste disposal-output (the Legal Notice 121 of 2006); ii. There are various actors including the environmental legislators (Law Makers-National and County assemblies), NEMA and County Governments-implementing bodies; iii. These actors are influenced by the law at different levels and magnitudes with the County Governments left with the major role of implementing the law, and finally; iv. The output of the agreement (law) has been ineffective in some counties while others it has worked. Incorporating the indicators of an effective law by the Law Society of Australia in this model makes it perfect over the other theories in assessing the effectiveness of the SWM in Kiambu town.

2.7 Research gap summary

Based on the literature research, it is clear that many scholars have supposedly claimed that many of the developing countries are challenged by improper solid waste management – a key aspect that is characterized by irresponsible dumping of waste, poor legislation by the local authorities, poor infrastructures to handle, treat and dispose solid waste, inadequate recycling industries among other pressing issues. Legislation, being the integral pillar in this study, the compliance to the existing laws in the developing countries, Kenya inclusive, has been identified to be adversely influenced by legal inconsistency, incapacity to solve arising disputes, lack of public awareness on the existence of laws and effective waste disposal practices, as well as, instable laws that are subject to frequent changes to match structural changes. There is no single study done on assessing the effectiveness of the 2006 Legal Notice No. 121 on waste management here in Kenya, despite the indiscriminate solid waste disposal. As solid waste disposal become uncontrollable in many counties here in Kenya, this study focuses on using Kiambu Town, as a case study, to assess the effectiveness of the Legal Notice No. 121 in regulating solid waste disposal. Herein, the study aims to fill the following gaps:

- Rationalize why there is continued indiscriminate solid waste disposal within Kiambu Sub-County
- Assess the position of the Legal Notice 121, in managing the solid waste in county levels
- Shed light to other non-legislative factors that compromise functionality of environmental laws
- Identify the nexus between effective environmental laws and efficient SWM

CHAPTER THREE: RESEARCH METHODOLOGY

Introduction

This section provides the research method approach that was used to answer the research questions. It reflects on the roadmap of the design that the study adopted to collect data, analyze, and report the data findings from the field which assisted in testing the hypothesis. It includes: the targeted area of the research, research design, sampling approach and sample size, and analysis techniques.

3.0 Area of study

Kiambu Town is located in Kiambu-Sub-County, Kiambu County-Kenya which has an urban population estimate of about 108, 698 people (KNBS, 2009). The town borders Nairobi City in the north, ruiru Town to the East, Kabete to the South West and Gatundu to the North East. Geographically, the town is located within 1°10'S 36°49'E coordinates with an elevation of 5,640 ft above sea level. The town has several surrounding villages and small centres including Ngegu, Kangoya, Riabai, Kihingo, and Ndumberi among others. In terms of forestry, the town is surrounded by the hilly Kikuyu farmland and wetlands which support growing of cash crops such as coffee. Also, the town experiences a typical oceanic climate (warm and temperate) with having average temperatures below 22°C in the warmest months with temperatures going, as low as, below 15 °C (Climate Date Org, 2018).

The average rainfall in a year is about 962mm with the greatest precipitation occurring in April with rainfalls going to as low as 212mm. July is the driest month characterized by 18mm of rainfall with March being the warmest month with temperatures averaging 20.4 °C. With this type of a climate, Kiambu's land is used in agricultural production with coffee being one of the main

commercial crops grown in the region. However, with the current trends in urbanization, the town is experiencing increased settlements with housing and real estate being on a high demand (Kiambu County Government,2018). Below are two map, figure 3.1 show a map of Kiambu county as a whole with an emphasis of Kiambu town while figure 3.2 shows a google earth image depicting Kiambu town.

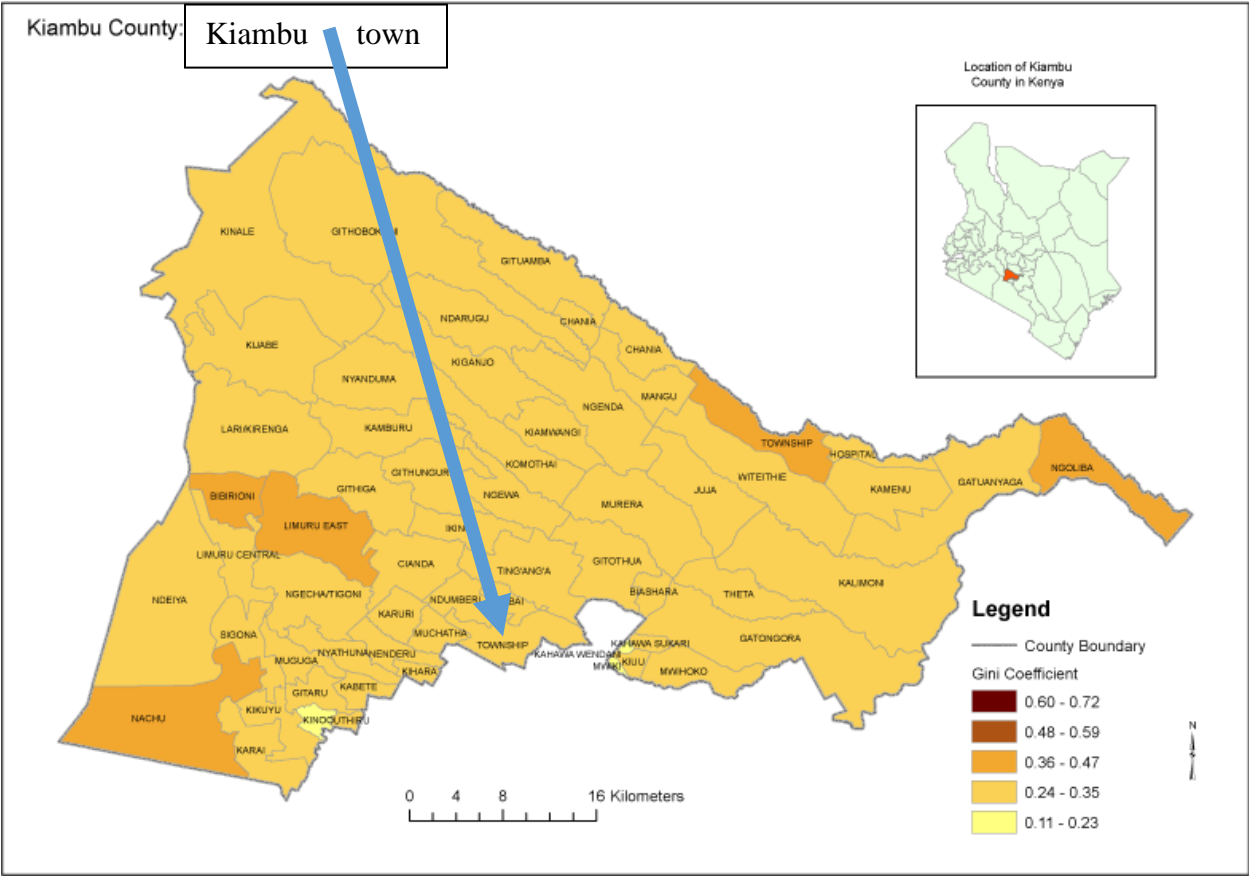


Figure 3.1: Map of Kiambu County. (Source:inequalities,sidint.net)

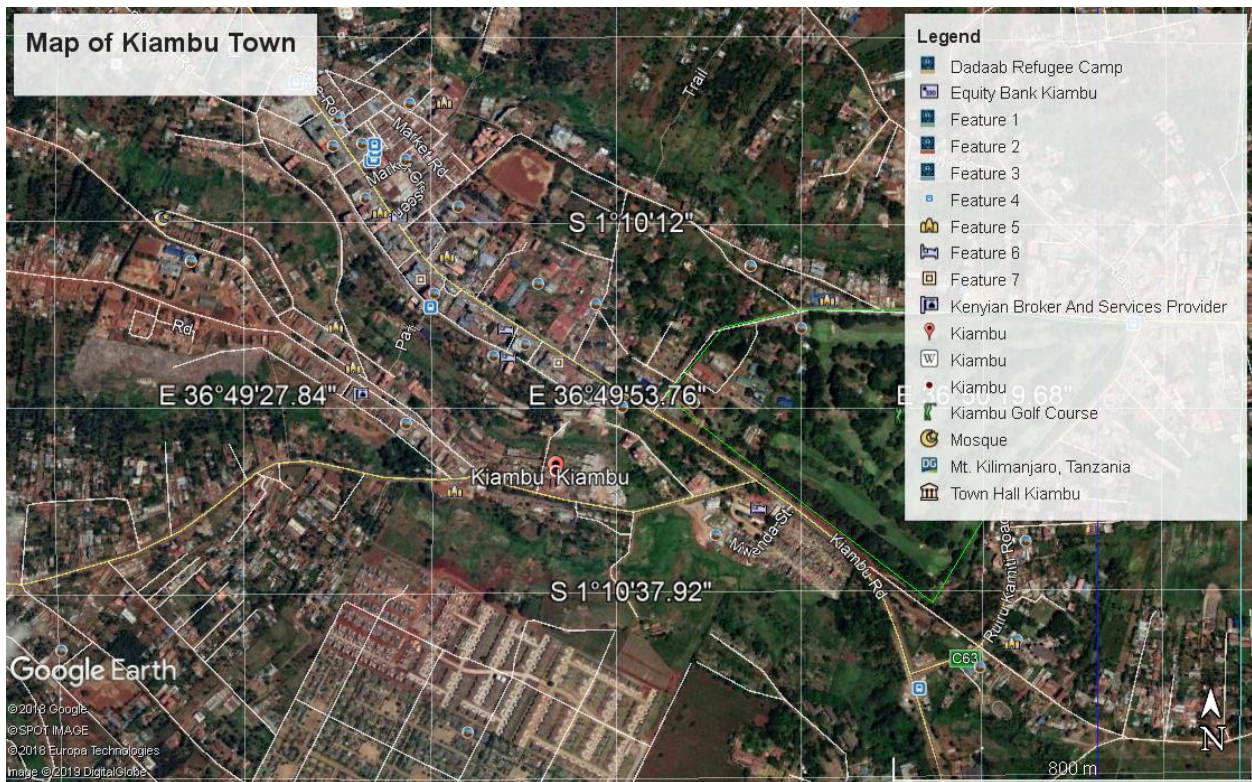


Figure 1.2: Map of Kiambu Town. (Source: Google Earth, 2018)

3.1 Research design

According to Silverman a research design entails a methodical plan which researchers use to study a particular social or scientific problem. A descriptive survey design which basically adopted a case study approach to achieve the objectives of this study was adopted (Silverman, 2011). Silverman added that descriptive survey designs are used to explore the characteristics of a particular subject, element or object from a specified population without changing the variables (Silverman, 2011). In this case, the case that was studied entails the Kiambu Town within Kiambu County. Through the descriptive survey design, the study assessed the effectiveness of waste management regulation subject to Legal Notice 121 (2006) in Kiambu Town, Kiambu County. Through this approach, the study found out the challenges that the County Government

experiences in their efforts to manage solid waste and this legal notice, the role of the county government in managing solid waste, and possibly identify the best evidence-based practices that can be implemented for sustainable county environment.

3.2 Sampling and Sample size

The study utilized both convenience and purposive sampling design to select the areas within Kiambu Town that were used to draw the sample subjects. According to Silverman (2011) convenience sampling is a non-probabilistic approach that allows the researcher select sample from the population that is easily accessible or easy to contact (Lohr, 2010). After identifying the most convenient areas, the study used convenience sampling technique to draw a sample of 80 study subjects from the general public (specifically the business people operating small-scale businesses) and administered study questionnaires while the rest of 20 participants (from the County Government's environmental department selected purposively) were subjected to study interviews. Marshall asserted that purposive sampling allows the researcher select study subjects that appear appropriate for the study – and in this case the researcher approached individuals who are adults and appear to have knowledge over environmental issues within the town, as well as, specific individuals from the county government handling environmental issues. The sample size was determined using the formulae below.

Computing the sample size

Sample Size = $n = z^2 (p) (1-p)/c^2$ (Cochran, 1977)

Where:

$z = z$ value 1.28 for 95% Confidence Level

$p = 0.5$

c = confidence interval 0.098

Sample size = $1.96^2 \times 0.5 \times (1-0.5) / 0.098^2 = 100$

Sample size = 100.

Twenty primary respondents affiliated with the County Government of Kiambu and NEMA officials stationed within Kiambu town were chosen and interviewed by using semi-structured interview questions. The demographic are of all officers in the sample location. This officers got to the saturation point, a number where no new information was obtained from further data as adequate data had been collected for a detailed analysis (Latham, 2013). This is based on the homogenous data the government respondents would avail towards the study and no divergence of responses would be attained. The officers' knowledge on environmental standards are therefore essential towards the study and their responses would help contribute towards attaining the science-policy interphase as stipulated by the Cap 387.

3.2.1 Unit of analysis

The study focused on two types of study subjects, the general public and County Government staff which would allow the researcher collects detailed insights about the topic. For the general public the unit of analysis was small-scale business persons within Kiambu town while for the County Government staff and NEMA staff, the units of analysis were individuals working in the sub-county environmental offices as shown below in table 3.1.

Table 3.1: *Summary of the selected sample*

S/No.	Category	Count of Respondents
1.	General Public – small-scale business persons	80
2.	<ul style="list-style-type: none"> • County staff – waste handling supervisors, management staff such as Town Engineers, SWM drivers, refuse collectors. • NEMA staff 	20
Total		100

3.3 Data Collection and Measurement

Data collection was dependent on the type of data required to answer each of the research questions. However, in this case, the study adopted both quantitative and qualitative approaches considering a combination of both primary and secondary data collection instruments. Primarily, the study made use of participant observation, open-ended questionnaires and semi-structured interviews. The questionnaires were administered to the general public while the interviews considered key informants within the environmental sector in Kiambu County offices – County Government staff. For the observed data, the researcher made use of photography to document the various SWM activities such as handling, disposal sites, and modes of transport within the town.

Secondary data was collected from peer-journal articles, Environmental periodicals, literatures from UNEP, NEMA, WHO and county website to explore more insights regarding SWM within the county focusing on the research questions. Evaluating the effectiveness of the SWM regulation examined the study participants' perceptions and opinions on the existing Legal Notice No. 121 which made use of a 5-point Likert Scale in assessing the main indicators of an effective law: stability, enforceability, public knowledge, acceptability, consistency, changeability, and the capacity to resolve disputes. The scores were recorded in a SPSS and MS Excel spreadsheet for analysis.

3.4 Data Analysis and presentation

The data was recorded in SPSS and Excel sheets for analysis and later organized to eliminate errors committed during data collection, organized and grouped depending on the various themes identified to allow for statistical interpretation. For the qualitative data (opinions, views, perceptions, and beliefs) the researcher coded (using selective coding), categorized, tabulated, and recombined it to create meaningful information that was used to answer the study questions. Through these approaches, the researcher identified how study variables related and drew conclusions. Typically, such conclusions were used to make judgments on the population. According to Saunders et al. (2012) inferential statistics make use of a study sample and generalizing the findings over the whole population. The presentation made use of descriptive statistics, tables, graphs and percentages using the SPSS and MS Excel software.

3.6 Ethical concerns

An Institutional Review Board authorization was obtained from the institution before undertaking the research. The respondents were assured that any information collected from them

remained confidential solely for purpose of the research and would not be used or shared anywhere for other purpose. Also, the researcher gave out research consent to be signed by the study respondents which indicated the study objectives and the potential effects that it can afford them.

CHAPTER FOUR: RESULTS

4.0 Introduction

The study focused on assessing the effectiveness of Solid Waste Regulation Legal Notice 121, 2006 within Kiambu town in an attempt of managing waste disposal. This chapter presents the study findings from both the interview and questionnaire instruments that the researcher used during the study. Both qualitative and quantitative data are presented in tables and graphs with explanations as they were observed in the study. Further, the researcher interprets the study findings as reported in the various statistical tools which are later used for further discussion based on theoretical perspectives examined in the literature review.

4.1 Variable Descriptive Statistics

In the attempt to assess the effectiveness of the Legal Notice No. 121, 2006 within Kiambu town, the study focused on specific variables which are theoretically acknowledged in evaluating laws and regulations. Table 2 below shows the overall descriptive statistics from the respondents for the study questionnaires. Ideally, in assessing each of the listed variable (characteristic of an effective law) in Column 1(in Table 4.1) the study adopted a 5-point Likert scale that allowed the respondents to indicate their own views regarding each of the indicators assessing the effectiveness of the law. Based on the scale Value 1 indicated lowest choice while Value 5 indicated the highest choice.

Table 4.1: Descriptive statistics of the study findings from questionnaires.

Variables (Characteristics of an Effective law)	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Awareness on role of government	80	4	1	5	2.93	.140	1.251	1.564
Public awareness	80	4	1	5	2.10	.133	1.186	1.408
Participation and involvement	80	4	1	5	2.89	.151	1.350	1.823
Enforcement level	80	4	1	5	2.40	.127	1.132	1.281
Influence by other legislations	80	4	1	5	2.11	.137	1.222	1.494
Stability	80	4	1	5	2.24	.127	1.139	1.297
Consistency	80	4	1	5	2.18	.118	1.053	1.108
Capacity to solve disputes	80	4	1	5	2.41	.132	1.177	1.385
Involvement county government	80	4	1	5	2.98	.122	1.091	1.189
Local community involvement	80	4	1	5	2.93	.126	1.123	1.260
Participation NEMA	80	4	1	5	2.45	.155	1.386	1.922
Overall Effectiveness	80	4	1	5	2.70	.114	1.024	1.048
Valid N (listwise)	80							

As per the study the following was revealed; Awareness of the role of government, (M = 2.93, SD = 1.251); Public Awareness (M = 2.10, SD = 1.186); Participation Involvement of the Public (M = 2.89, SD = 1.350); Enforcement Level (M = 2.40, SD = 1.132); Influence by other Legislations (M = 2.11, SD = 1.222); Stability of the Law (M = 2.24, SD = 1.139); Consistency of the law Application (M = 2.18, SD = 1.139); Capacity to solve disputes (M = 2.41, SD = 1.053); Involvement of County Government (M = 2.98, SD = 1.177); Local Community Involvement (M = 2.93, SD = 1.091); Participation by NEMA (M = 2.45, SD = 1.123); Overall Effectiveness (M = 2.70, SD = 1.024). The above findings are the views of the respondents from the public domain within the research area, and it is clear that each of the variables reported has a higher standard deviation from its mean. Such an aspect tells that the respondents' values reported were highly dispersed from the mean. For instance, taking an example of Influence of the Law by other county legislation (which aimed to assess the law's stability, the mean was 2.11

with a standard deviation of 1.222. Therefore, this indicates that the response values lied within 1.222 standard deviations from the mean (a band of 0.888 to 3.332).

4.2 Level of Awareness of Solid Waste Management Regulation

4.2.1 Awareness of the Law

Based on the theoretical evaluation of an effective law, the public bound by the law should be fully aware of its existence, scope, and limits, as well as, its designated areas of regulation. However, based on the study findings, it is clear that majority of the citizens within the town are not aware of the law and its various functionalities. Figure 4.1 below shows that most responses were skewed on the right with around 42% of them having no knowledge of the law and only 5% of the respondents had information about it. It may be deduced that most of the Kiambu town citizens are not aware of the law.

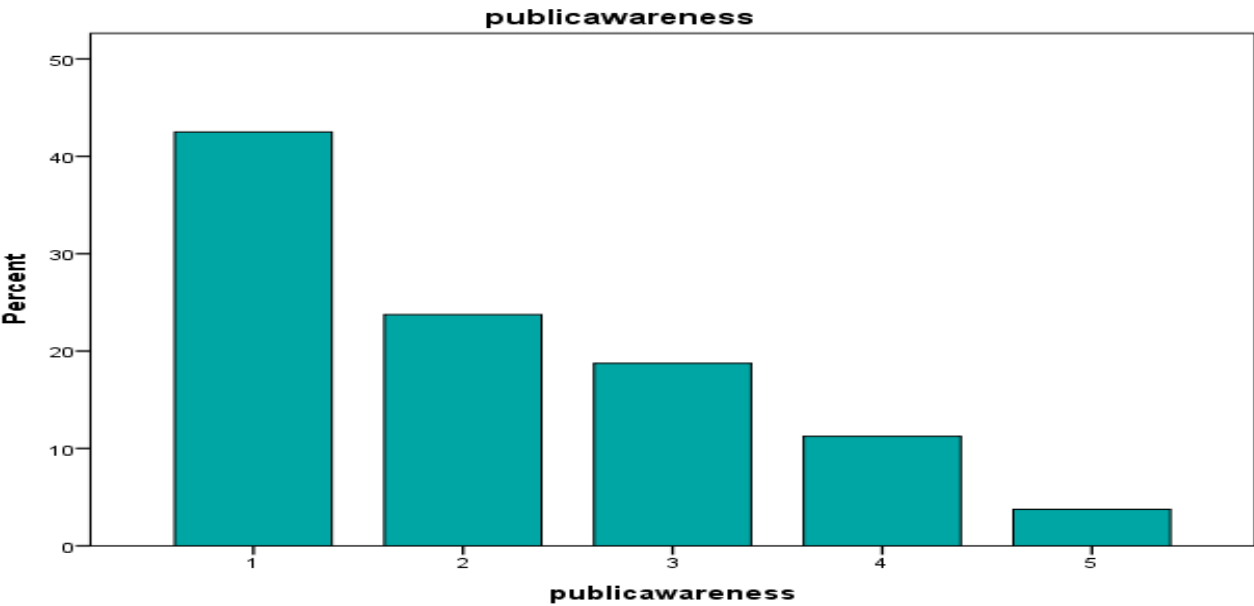


Figure 2.1: Public Awareness of the Waste Management Regulation, 2006 (5 point Likert scale-value 1 representing **not aware** as lowest choice & value 5 representing **fully aware** as the highest choice).

Considering the interview conducted on the county environment officers, 30% of the participants were fully aware of the existence of the law, 40% were aware and 30% were neutral about it. Considerably, these were country officials working in the environmental sector and it is clear that 70% are at least aware of the existence of the law as clearly shown on table 4.2.

Table 4.2: Awareness by the County Environmental Officers.

	Frequency	Percent	Valid Percent	Cumulative Percent
perfectly aware	6	30.0	30.0	30.0
Valid Aware	8	40.0	40.0	70.0
Neutral	6	30.0	30.0	100.0
Total	20	100.0	100.0	

4.2.2 Awareness of the role of government

One of the most common indicator that a law is effective within its legislative environment is the public awareness of the law and the role undertaken by the government in influencing the law towards the expected direction for the most desirable outcome (minimal waste disposal). Based on the study a high number of the respondents were neutral on this variable (31%) with the lowest number (11%) acknowledging that they were aware of the government's role in influencing the functionality of the law. 14% were not aware at all about this. Figure 4.2 below gives a visual summary of the results.

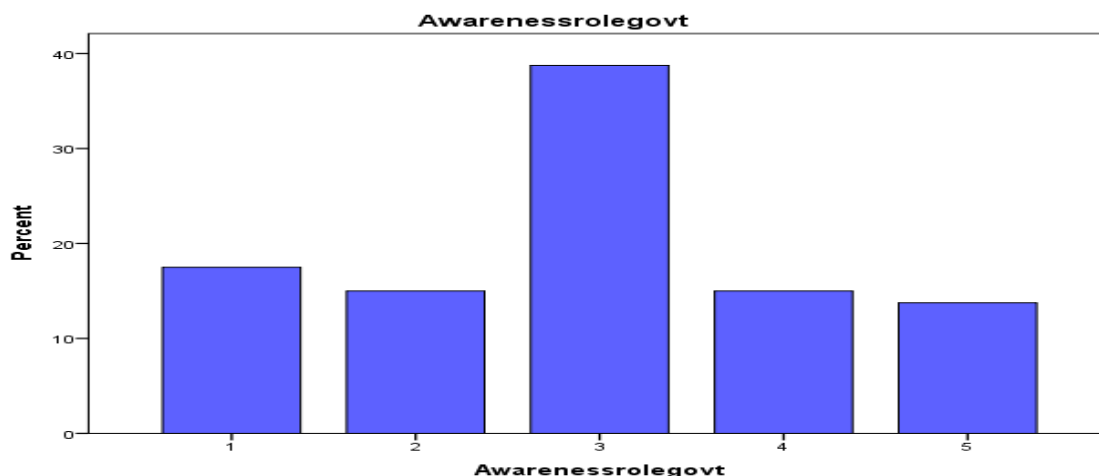


Figure 4.2: Public Awareness of the Role of the Government (5 point Likert scale-value 1 representing not **aware** as lowest choice & value 5 representing **fully aware** as the highest choice).

4.3 Acceptability of Solid Waste Management Regulation

4.3.1 Acceptability and public participation

With existence of an effective law, it must be in a position to allow the public get involved in it to ensuring that it moves in the designated or desired direction in terms of curbing the underlying problem in this case the indiscriminate disposal of solid waste. Technically, involvement may take various perspectives such as refraining and warning people breaking the law, taking part in voluntary waste disposal activities, and creating public awareness of the law. Based on Figure 4.3 about 22% of the study respondents did not participate or had very low participation in whatever activity in support for this law while a vast number of them took part in it. Actually about 12% of the respondents fully participated or highly participated in supporting the law with a relatively high number (25%) taking part in it. Based on figure 4.3, the distribution of the responses took a normal shape indicating that the citizens were fairly involved in matters related to supporting the law.

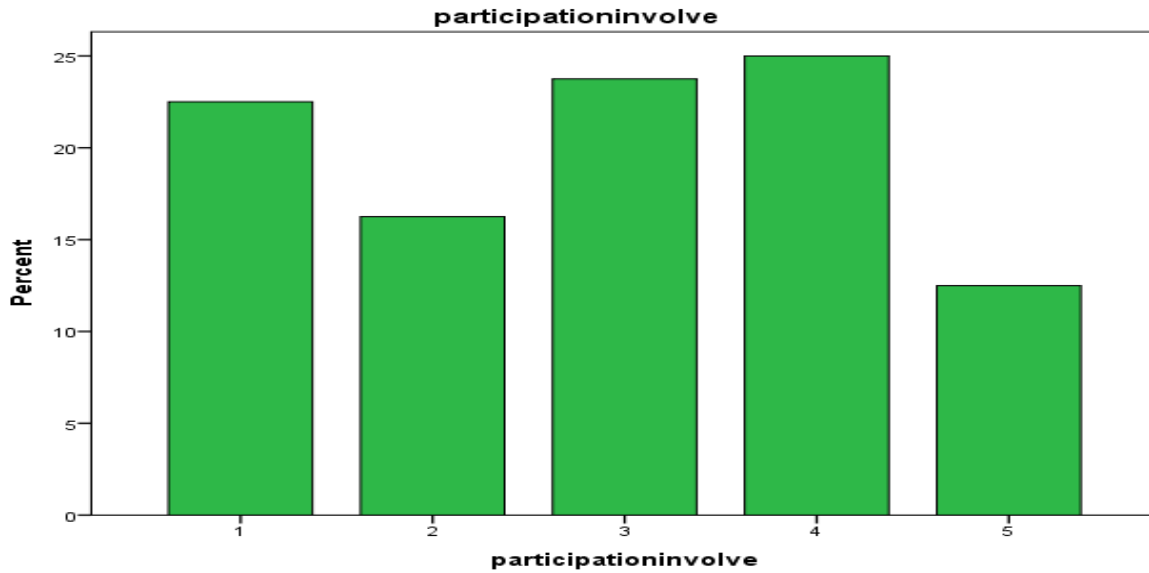


Figure 4.3: Public participation in supporting the law((5 point Likert scale-value 1 representing very low participation as lowest choice & value 5 representing very high participation as the highest choice).

4.3.2 County government involvement

The success of any law is also influenced by the involvement of other related authorities in the same legislative framework which offers support when it comes to implementing the law. The study found that the County Government of Kiambu was fairly involved in supporting the town in implementing the solid regulatory law. Figure 4.4. shows the frequency distribution of the responses which reveals a normal distribution or a bell-curved distribution.

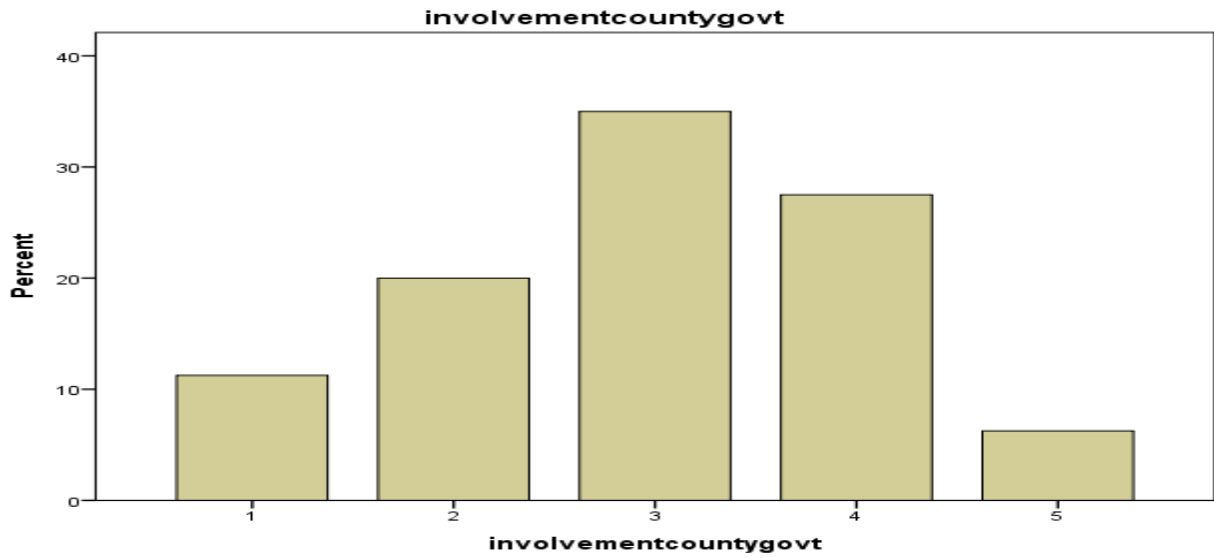
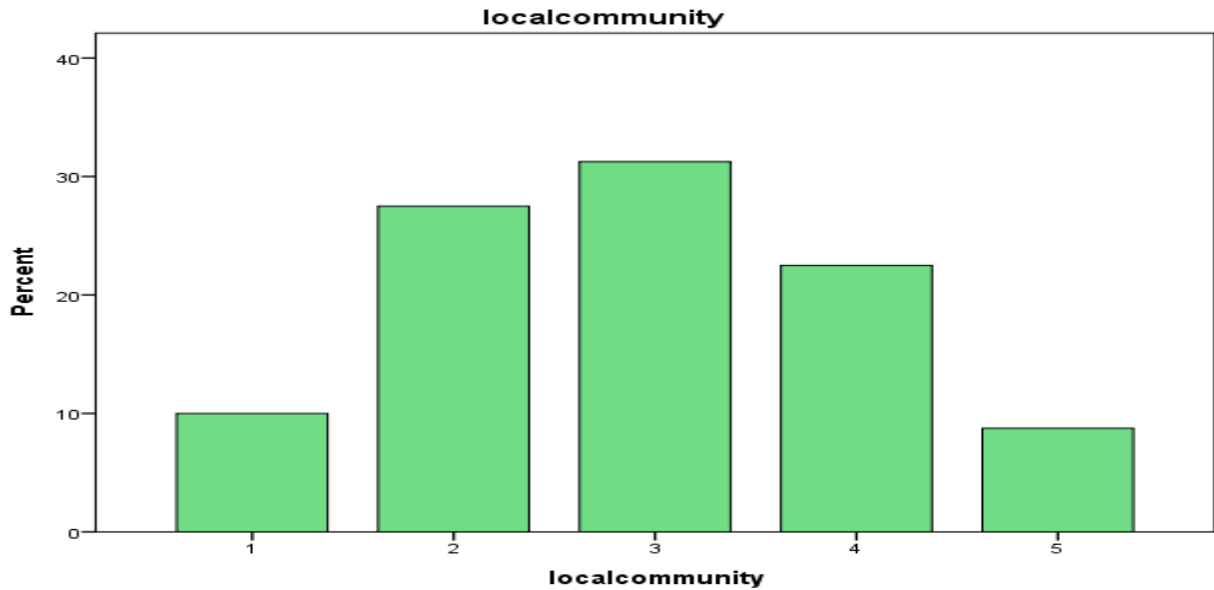


Figure 4.4: The level of county government involvement in implementing the waste regulation ((5 point Likert scale-value 1 representing not **involved** as lowest choice & value 5 representing **highly involved** as the highest choice).

4.3.3 Local community involvement

On the other hand, local community within the town in the control and management of solid waste, particularly through proper disposal, was revealed to be fair. Actually, with the knowledge that most citizens in the public domain are not aware of the existence of the solid waste regulation, it is clear that there is a fair waste disposal in the town. A relatively fair number of citizens are considerate in disposing solid waste in a responsible way as seen in the graphical frequency distribution on figure 4.5. Based on the illustration, most responses were spread around the mean (2.93) with a standard deviation of 1.123, indicating a fair involvement of the local community in proper waste disposal and management.



*Figure 4.5: Local community involvement in the management of solid waste in the town ((5 point Likert scale-value 1 representing **not involved** as lowest choice & value 5 representing **fully involved** as the highest choice).*

4.3.4 Participation by NEMA

NEMA assumes a very critical role in the waste management and regulation activities within the various counties in Kenya established under the Kenyan Constitution. Typically, when it comes to the waste regulation, it is involved in coordinating various environmental activities which are undertaken by different lead environmental agencies such as the county governments. NEMA ensures proper integration of environmental development policies in the various governments and county level development plans, proper waste management, as well as, utilization of environmental resources. With such scenario, the study assessed the level of participation of this regulatory body within the town which aided the understanding of how effective the solid waste regulation was in managing the solid waste in the region. As per the study, NEMA had a poor participation level based on the public opinion. The Table 4.3. shows

that a vast number 28% claimed that the NEMA’s participation was very poor with only 8% assessing it as highly participative. However, the rest of the responses were skewed to the right.

Table 1.3: Evaluation responses on the level of participation by NEMA.

	Frequency	Percent	Valid Percent	Cumulative Percent
1	28	35.0	35.0	35.0
2	18	22.5	22.5	57.5
3	12	15.0	15.0	72.5
Valid 4	14	17.5	17.5	90.0
5	8	10.0	10.0	100.0
Total	80	100.0	100.0	

4.4 Compliance and Enforcement Levels

4.4.1 Enforcement Level

Law enforcement entails an umbrella term connoting a professional group of individuals or regulatory personnel tasked with keeping an order especially via investigations and prevention of crimes. When it comes to enforcing the solid waste law within Kiambu town the level of enforcement is fair with vast number of the respondents feeling that the enforcement level was not to the expected standards. Figure 4.6 indicates that the responses were slightly skewed to the right. 21% of the respondents revealed that the enforcement level was totally not perfect with 7% claiming to be fair and just 4% asserting that it was perfect.

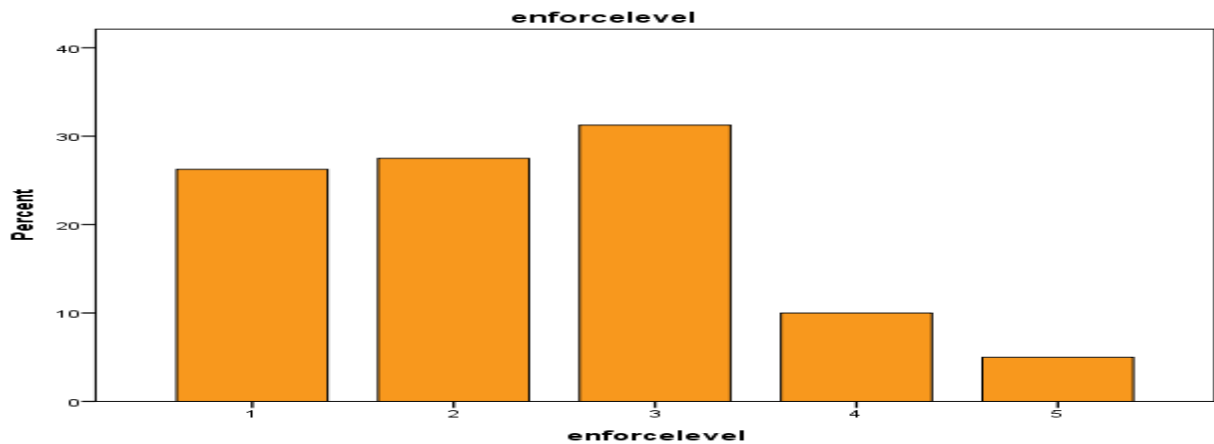


Figure 4.6: Enforcement level of the law by the relevant county legislators (5-highest levels of enforcement while 1-lowest level of enforcement).

4.5 Stability of the Solid Waste Management Regulation

4.5.1 Stability of the regulation

(1 = Highly Stable, 5=highly Unstable)

Based on the above research item on the influence of the solid waste regulation, this subsequent item aimed to assess the overall stability of the law. There was a consistency in their responses as it is clear that the frequency distribution was still skewed to the right with fairly a vast number noting that the law was stable, only 2% indicated that it was not as indicated on figure 4.7.

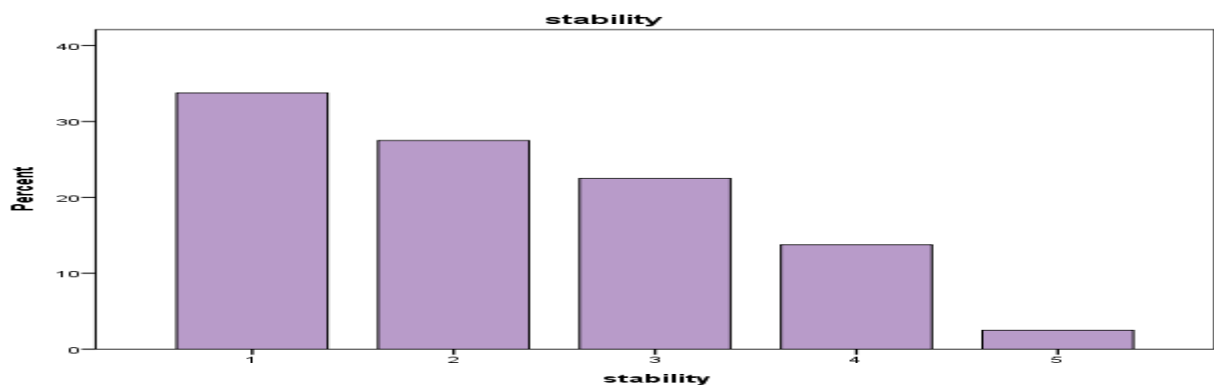


Figure 4.7: Overall stability of the Solid Waste Regulation (5 point Likert scale-value 1 representing highly **stable** & value 5 representing **highly unstable**).

On the other hand, only 5% of the interviewees perceived that the law was very stable when it came to addressing problems related to waste disposal in the sub-county. 35% perceived it to be stable, while 40% were neutral about the stability of the law with 20% terming it unstable as indicated on table 4.4.

Table 4.4: Interview assessment on stability from the County Environmental staff.

	Frequency	Valid Percent	Cumulative Percent
Valid very stable	1	5.0	5.0
Stable	7	35.0	40.0
Neutral	8	40.0	80.0
Unstable	4	20.0	100.0
Total	20	100.0	

4.5.2 Influence by other legislations

The legal stability of any law is influenced by the judicial adherence of the informal norm of *stare decisis* and precedent indicating that without law stability, the legislators cannot manage their affairs effectively. Further, the ability of a law is determined by its vulnerability of being overridden or compromised by other legislations hence subjecting the law to frequent amendments. The study focused on assessing how the Legal Notice No. 121 of 2006 is stable in regulating the solid waste within the Kiambu town and the overall stability. A vast number 36% of the respondents claimed that the law was not influenced by other legislations with just a small number 2% claiming that the law was highly influenced by other county legislations. However, the frequency distribution shows that the law was fairly not influenced by such external legislations as the data was skewed to the right as indicated on table 4.5.

Table 4.5: Frequency table showing responses for influence of the law by other legislations (stability of the law) from the 80 study participants.

	Frequency	Percent	Valid Percent	Cumulative Percent
1	36	45.0	45.0	45.0
2	16	20.0	20.0	65.0
3	13	16.3	16.3	81.3
4	13	16.3	16.3	97.5
5	2	2.5	2.5	100.0
Total	80	100.0	100.0	

4.6 Consistency of the Solid Waste Management Regulation

4.6.1 Consistency of the law

The consistency of applying a particular law in its legislation determines its effectiveness to a big extent. Technically, it indicates that the law stands a chance to be applied equally, without any noticeable unjustifiable differentiation or favor. The levels of inconsistency may vary especially in treating a particular group of people inconsistently over a period of time or inconsistency between various groups or individuals. Therefore, the study sought to establish if the Solid Waste Regulation within the town of Kiambu is applied inconsistently either across different groups of people. Based on the study, a vast number of respondents claimed that the law was poorly consistent with the frequency distribution being skewed to the right. Specifically, the Frequency Table 4.6. shows that 25% of the respondents noted that the law was poorly consistent (inconsistent) with only 2% assessing it as highly consistent, though majority of the responses were skewed to the right as shown.

Table 4.6: Consistency level of the solid waste regulation in terms of implementation

	Frequency	Percent	Valid Percent	Cumulative Percent
1	25	31.3	31.3	31.3
2	27	33.8	33.8	65.0
3	19	23.8	23.8	88.8
4	7	8.8	8.8	97.5
5	2	2.5	2.5	100.0
Total	80	100.0	100.0	

4.6.2 Capacity to solve disputes

The capacity of a law to solve disputes helps in the assessment of public laws especially when it comes with their effectiveness especially in settling various legislative conflicts that may arise from the diversity of laws relating to solid waste management and other environmental jurisdictions. Typically, this is a major cornerstone for public laws which determines the smoothness of their applicability and reliability. Based on the research findings, the solid waste regulation had a relatively poor capacity to solve disputes indicating that, there was potential legislative and jurisdiction barriers to its functionality which led to potential conflicts hence undermining its ability to settle disputes in the line of solid waste management. Table 4.7. shows that 23% of the respondents felt that the law had very low capacity while 3% rated it as having a high capacity of solving disputes. However, the graphical illustration shows that vast numbers of responses were skewed to the right hence deeming the law as relatively having a low capacity to solve disputes.

Table 4.7: Capacity to settle/solve disputes related to solid waste management.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	23	28.8	28.8	28.8
2	20	25.0	25.0	53.8
3	21	26.3	26.3	80.0
4	13	16.3	16.3	96.3
5	3	3.8	3.8	100.0
Total	80	100.0	100.0	

4.7 Overall effectiveness

Considering on all the different factors that influence the performance of the waste regulation included in the study, the respondents were required to rate how they felt about the general effectiveness of the law in regulating waste management within the region. Based on the findings; 10% rated it a score of 1; 23% rated it a score of 2; 32% rated it a score of 3; 11% rated it a score of 4 and just 4% rated it a score of 5. This information was captured in Table 4.8.

Table 4.8: Overall effectiveness responses from the 80 study participants.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	10	12.5	12.5	12.5
2	23	28.8	28.8	41.3
3	32	40.0	40.0	81.3
4	11	13.8	13.8	95.0
5	4	5.0	5.0	100.0
Total	80	100.0	100.0	

Typically, as per the frequency distribution illustration (Figure 4.8), it can be concluded that the solid waste regulation law in Kiambu town is fairly effective. Most of the scores rated are distributed in the right skewness tail of the distribution. Considering the fact that the study

incorporated both the qualitative and quantitative approaches, most of the qualitative information is incorporated in the discussion part which integrates both the opinions given, the interpretations of the quantitative information, and existing theoretical perspectives to fully understand the effectiveness of this law – hence formulating a foundation of policy recommendation thereafter.

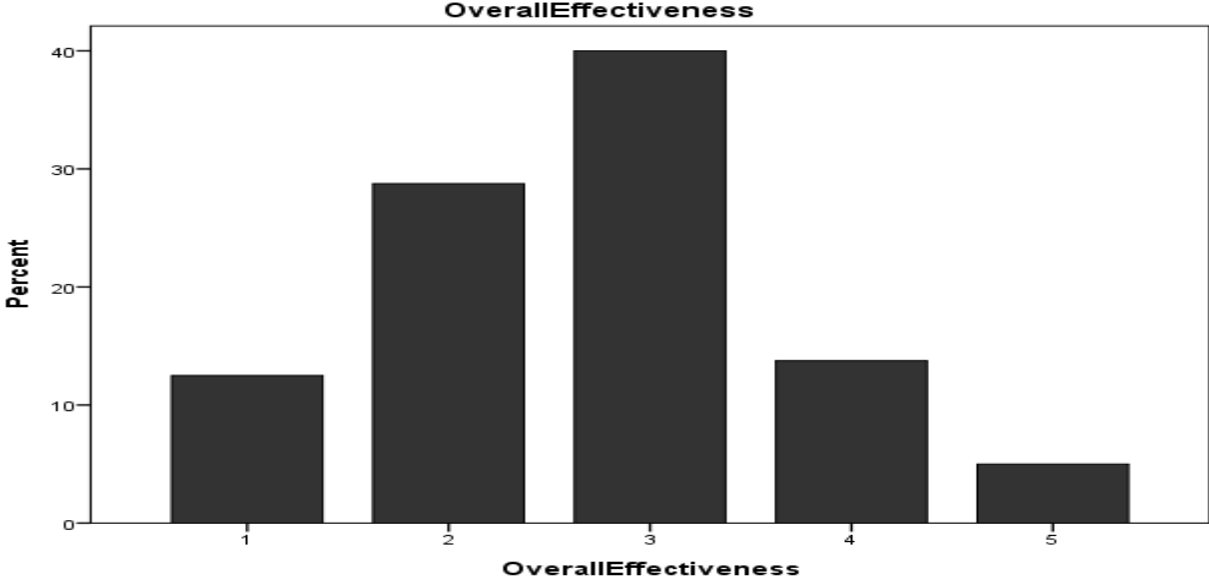


Figure 4.8: Assessing the overall effectiveness of the SWR, 2006. (5 indicating very effective while 1 indicating not effective)

CHAPTER FIVE: DISCUSSION

5.0 Introduction

The study investigated the effectiveness of the Legal Notice No. 121, 2006 on solid waste management in Kiambu town. The Chapter five of the study reflects on the study findings and ties the results with the existing research or literature review to identify any inconsistencies or similarities that would assist in making conclusions. Additionally, the section ties the quantitative and qualitative findings, which were collected and reported from the field.

5.1 Reflection on Major Findings

The chapter focuses on the awareness of the law, its enforcement, overall stability, and consistency in its application, capacity to settle disputes, involvement of the public, County Government and National Government (NEMA). Tentatively, these elements were considered as good assessors of an effective law. Ideally, the legal notice No. 121 in this study is treated as a public law – governing the citizens of Kiambu town on solid waste management. Based on the literature search, the study found that in the developing countries, solid waste management is a big challenge that has engulfed the success of some national environmental policy implementation (Marshall et al. 2013). Major problems that have led to such insights include poor policymaking, overriding legal frameworks, lack of public participation, unstable environmental regulations and insufficient resources to accommodate the waste disposal in these countries.

Other problems cited include the haphazard urban growth that has increased the waste disposal when compared to the existing resources to manage the waste. Further, these countries lack sufficient and reliable technologies to recycle the solid waste hence it just finds its way to

the dumping sites and streets. Kiambu town lies in Kenya which is a developing country, and the major interest of the study was to assess the effectiveness of the current legal framework in solving the indiscriminate solid waste disposal. To answer the research questions, the research adopted qualitative approach to collect data from the public and county environmental officers. All the participants that were engaged in the study were adults whom were believed to have knowledge on waste disposal and its effects to the environment. However, the study findings did not approve the research hypothesis. The solid waste management law ‘Legal Notice, No. 121, 2006’ was not effective in Kiambu Town. However, all the research objectives were met as discussed in 5.2.1 through 5.2.2.

5.2 Level of Awareness of Solid Waste Management Regulation

5.2.1 Public Awareness of the Law

The awareness of the solid regulation law was the first research objective and based on the study findings, it was met. The public awareness was seen as the ability of the general public to be fully aware of the law in terms of its scope, existence, and limits as well as, the consequences of violators. It is clear that the waste management legislation Legal Notice No. 121 is not publicly known by many people. For instance, the study expounded on the issue using follow-up questions to dig deeper and understand the issue well. A vast number of participants claimed that they had never heard of the law before, and this tells that there is lack of reliable public information about the law. Additionally, the public is ignorant when it comes to mastering the type of laws that govern their town affairs. According to Ashok (2013) public legal awareness which is achieved through legal education empowers individuals regarding issues that are related

to a particular law and this helps to promote consciousness legal culture when it comes to enforcement (Ashok et al.2013).

Tentatively, this tells that civic education aimed to create public awareness of the existence of a law such as the Legal Notice No. 121, 2006 would make the public know the scope of the law and the justice system related to it, as well as, societal activities that can improve commitment to achieve a healthy environment. A key takeaway that can be drawn from the study is that the National and County government has played a minimal role in creating awareness of the environmental issues that affect the town and this can be maximized through public campaigns and media communication to sensitize the public about the law and its scope. Therefore, poor public awareness of the law rationalizes the increasing solid waste disposal which is a challenge for the county environmental administrators to achieve sustainable enforcement.

5.2.2 Awareness of the Role of Government

A high number of the participants were neutral when it came to understand the role of the National and County Governments when it came to addressing solid waste disposal in the town. The enforcement of any public law is mostly left in the domain of both Governments. The government has an exclusive role to regulate the scope of a particular law when it comes to enforcement and regulating public nuisance that adversely influences the effectiveness of any particular law. The common law theory highlights some of the governments' role in addressing public laws including the ability to illegalize abnormal activities that influence the well-being of the public (Tietenberg et al. 2016). When it comes to the environmental sector, the government is

entitled to adopt strict liability for any abnormal activity from the public domain that interfere with natural resources such as water, air, and land – such a negligence and pollution.

The role of government has been reflected by different scholars when it comes to implementing effective policies and directives that target to minimize solid waste management. Studies by (Eden,2016) and (Ezeah et al.2010) claimed that the government is the central unit that stands out to protect environment through setting the public policies to mitigate poor waste management practices – and this spans from liquid to solid waste disposal which have remained salient environmental challenges in the developing countries. The study cites poor awareness of the role of government, which translates to the idea that, the current government practices towards managing waste disposal within Kiambu town is minimal simply because the government has done little efforts to regulate indiscriminate solid waste disposal. However, there may be a chance that the government delegates most of its roles to the county administrators – but for the law to be fully effective, the government must have its efforts publicly known and seen.

5.3 Involvement and Acceptance of Solid Waste Management Regulation

The second objective of the study was assessing the level of acceptance of the SWR, 2006 in Kiambu Town – and as per the study findings, this objective was met. The acceptance of the SWR, 2006, in Kiambu Town can be assessed through several parameters such as the involvement of the different authorities and the public towards enforcing it or implementing sustainable policies under this regulation. For instance, this research objective was met by the findings. With the current setting of legal framework of various sectors within the counties, involvement of both the county and national government influences the capacity of various laws

in the country. Actually, involvement of the county government personnel indicates increased human resources in running the affairs related to the legislation such as enforcement. It is clear that the Kiambu County Government is fairly involved in supporting the waste disposal legislation within the region. A balance between the roles of the county and national government is recommendable for the success of any legislation especially in the sub-counties.

A fair involvement of the county government as per the study may indicate that there are inadequate resources especially with the human capital in carrying out affairs related to this solid waste disposal legislation. The sub-county authorities may not solicit all the required materials and resources to handle solid waste disposal without financial support from the county government. Actually, most revenues collected through taxes are made by the county government and shared to various sub-counties to assist them in executing roles such as waste management. Without sufficient involvement, it therefore, tells that the law or legislation will be inadequate to efficiently handle solid waste – hence ineffective.

The local community has an exclusive role in participating in law enforcement. Public participation in maintaining the environment and enforcing laws considers involving the County officers, the local citizens, and high decision-makers in extending the county services to facilitate achieving long-term improvement in the societal well-being (Eden, 2016). For instance, the public participation approach outlines the major approaches that the local citizens can be involved in enforcing a public law ranging from voluntary basis to participating in the neighborhood watch. Other approaches that the citizens can be involved in enforcing environmental laws is through participating in public initiatives and projects that sensitize the

people on the necessity of healthy and friendly environment – hence leading to environmental value co-creation (Hardyman et al.2015).

Considering the existing literature by (Marshall et al. 2013) public participation in enforcing environmental laws creates awareness among the public, which a high number of the citizens get to be involved in adhering to the regulations that are imposed to discourage indiscriminate waste disposal. The study found out that the level of involvement of the local community was fair and this may attribute to the fair solid waste disposal in the town. However, there is a gap that a significant number of the citizens are not involved and this may be used to conclude that the legislation is not effective to the expected standards. More public programs to sensitize the public on the existence of the law, and necessity of proper waste management need to be drawn on board to support enforcement of the law within Kiambu town.

NEMA is tasked with various roles in safeguarding the environment within the Country. For instance, it engages in promoting the integration of environmental considerations into development projects, plans, and programmes with the view to ensuring proper and rational utilization of environmental resources and sustainable activities that protect human life. Waste disposal is an ecologically unsustainable activity that can expose many people to health complications. When it comes to enforcing environmental roles imposed by the national or county government, NEMA carries out the actual monitoring and execution of various activities as per the law such as punishing law breakers as stipulated under the Environmental Management and Coordination Act (EMCA), 1999. As per the EMCA, NEMA provides environmental protection through impact assessment, audit, monitoring, restoring orders, easements and conservative orders (UNEP, 2006).

Based on the study, majority of the participants (28%) felt that NEMA's involvement in protecting the towns's environment was poor with more responses being skewed towards "poor involvement" choice with only a small number perceiving it to be highly participative. For effective environmental management and protection, NEMA should be on the forefront in guiding people on the legislation and overseeing its application and enforcement especially when it comes to improper waste disposal. Therefore, as for now the law has failed and poor involvement by NEMA can be an attributive factor.

Public participation in managing waste may appear extrinsically non-rewarding but its outcome is of high value to the society. Actually, the issue of pollution as a negative externality causes harmful health effects to the people. However, many people have the perception that the government has the exclusive role to manage waste disposal. Based on the study there is a minimal participation that comes from the public and this is a weakness seen with the law. Most of the individuals who participated in managing the waste disposal adopted home-based strategies to dispose their waste such as having dustbins to collect domestically-generated waste. Additionally, some participants indicated that they hired some waste collectors at a small fee to frequently come and collect their waste.

On the other hand, some other participants claimed that they have organized small groups more like organizations which are licensed that carry out waste collection activities from the public. Other participants reported that they collect and burn the waste collected from their homesteads. Basically, this tells that these people have a personal responsibility and are aware of the consequences of improper waste disposal not only at personal level, but also to the whole society. However, a major challenge is seen with the most participants who engaged in collecting

and disposing the waste at their homesteads – they lack proper skills to carry out waste sorting and this leads to poor disposal especially when different solid wastes find their way to the same dumpsite. Several participants claimed that waste collection and disposal is not their role and based on this they do not participate in it. According to these participants, this role is left in the hands of the government – but this is an impeding factor to sustainable waste treatment in the region.

On a different note, the waste collection resources such as dustbins used to collect waste are expensive to purchase especially in the families that have low incomes. Another insight that has made personal or family-based waste collection difficult is the banning of plastic of the PVC bags by the government through NEMA. Actually, several participants cited that the proposed ecologically friendly bags are expensive to purchase and cannot be used to collect dust when compared to the previous polythene bags that were free or cheap. Merely, this is a big weakness and a challenge embedding the effectiveness of the legal regulation of the law in this locality.

5.4 Compliance and Enforcement Levels

The third objective of the study was met – assessing the compliance and enforcement levels of the SWR, 2006, within Kiambu town. Compliance by the public on the environmental regulation within the town is an indicator of efficient enforcement levels. Further, the level of enforcement assessment, as a parameter, focused on investigating whether the local environment authorities executed their responsibilities and orders towards achieving fairness and justice in dealing with legal matters related to the disposal regulations. From the findings, it is clear that the responses are skewed to the right indicating that the level of enforcement is poor. The common problems that were cited by the participants were related to incapacity of the government to

enforce the law. Notably, the main indicator that led to such insights were the massive and increasing indiscriminate disposal along the streets. Also, the county resources used for collecting the waste are not available sufficiently within the town and the available ones are not evenly distributed. According to the study, most dustbins are located in the congested areas or commercial buildings and market places and this indicates that substantial waste is finding its way to the streets. A weakness that can be identified here is insufficient waste collection resources which has compromised regulating waste disposal – people are encouraged to dispose waste anyhow.

Additionally, some participants noted that it takes time for the county garbage collectors to empty the dustbins and this is a challenge when it comes to discouraging indiscriminate disposal. Further, trapping solid waste is not easy because the available dustbins do not allow separation of waste indicating that more solid waste goes to the inappropriate destination. The public is not aware of separating the waste into its respective states such as solid and liquid waste and dispose each of them in the right place. Moreover, the participants cited that open burning of solid waste such as plastics is frequent and this is against the existing legislations on solid disposal within the county – there are designated dumpsites for proper disposal of such wastes rather than burning them. Burning solid waste leads to increased pollution which can adversely affect people's health while it adds carbon emissions to the ozone layer which is associated with global warming. Basically, these are challenges that make the whole disposal process a challenge, when it comes to enforcement.

5.5 Stability of the Solid Waste Management Regulation

The fourth objective of the study was assessing the level of stability of SWR, 2006 within Kiambu Town. According to the study findings, this objective was met. The influence of the legislation by other legislators assessed the overall legislation of the law. The findings reported that the law was fairly stable and no significant influence was reported from other existing legislations from other sectors. Such an aspect tells that the town has firm and clear regulations in the other sectors such as farming that do not adversely compromise other regulations such as in the environmental sector. Such an aspect is an opportunity towards effective legislation process of the Legal Notice No. 121 in the county, though this is not the case.

Therefore, the law is stable based on the study and this tells that other exogenous factors need to be assessed which makes the law ineffective when it comes to regulating indiscriminate waste disposal in the town. The few participants that cited the law as unstable claimed that it is adversely affected by directives and policies which guide waste collection schedules such as the frequency for collecting waste within the town. Such an aspect is true, because waste collection requires financial and human resources. Technically, this means that lack of sufficient resources makes the waste collectors unable to carry it as per the directed or present schedule – and this makes some areas of the town going for week or two without having their waste collected.

5.6 Consistency and capacity of the Solid Waste Management Regulation

5.6.1 Consistency

The last objective was assessing the capacity and consistency of the solid waste management regulation, 2006. According to the study findings the study objective was met and two parameters; consistency and capacity to regulate solid waste were used to assess the

effectiveness of the regulation. Consistency as a measure of the effectiveness and assesses the chances that the law stands out to be equally applied without compromising justice. The waste regulation law is deemed inconsistent by majority of the participants indicating that its application was biased. Such an aspect is a big challenge especially when it comes executing or making judgments on cases that pertain illegal disposing especially by businesses units. A significant unethical problem that compromised the consistency of the law was corruption and bribery for businesses that engaged in improper disposal. Also, the county collectors are biased when it comes to collect waste – they favor some areas than others. For example, they concentrate within the commercial areas than the residential ones. Such an aspect indicates that the law is not consistent in its implementation, however, this may result from the fact that many people in the public domain are unaware of how the scope of the legislation and their rights when it comes to its application.

Further, the current acts by the county legislators or administrators raise moral and ethical issues of concern which impede sustainable solid waste management within the town. The public policy doctrine supposes that public laws and policies that influence the affairs of the public should be subjected to justice and fairness – and these are missing with the current practices within the Kiambu town solid waste management (Moufang, 2012). Typically, the regulation should ensure that waste is collected as per the directives without any favor, and therefore, based on this study it can be concluded the legislation is not effective as far as its consistency is concerned.

5.6.2 Capacity of the Law to solve disputes

The capacity to solve disputes considers the ability of the law to settle various environmental waste disposal disputes within the sub-county. Typically, the interview indicated that there are significant disputes that have never been settled related to improper or illegal waste disposal especially between business units. Such a problem may result from the inconsistencies of the law and favor of some activities which discriminates some business. Additionally, poor enforcement is also a challenge that compromises the capacity of this legislation from solving legal disputes as expected especially the ones that have been subjected to litigation process. However, the law was seen to be effective when it comes to solving potential conflicts that may emanate from disposal of waste in undesignated areas by business units like the hotels. The county government is strict and has the authority to file a law suit for violators of this legislation or fining violators.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The Chapter six presents the conclusions and recommendations of the study based on the findings and discussions presented in Chapters Four and Five. Additionally, the chapter reflects on the theoretical and policy implications of the study especially to the existing literature and practices of solid waste management and legislation in the developing countries. Lastly, the chapter highlights the limitations of the study and makes suggestions that can be incorporated for future research on the same field.

6.2 Conclusion

Based on the compliance theory in assessing the effectiveness of a public law, the study found that the Legal Notice 121, 2006 is not fully effective. Such a theoretical framework is appropriate in the study in several ways. First, it relates how challenging policies adversely affects public behavior in complying with the laws that are enacted. In this case, the Legal Notice 121 is challenged by insufficient public awareness of its existence. Consequently, this may be associated with indiscriminate solid waste disposal within the town. Still, it can be inferred that most developing countries that have poor legal infrastructure especially in their environmental sectors are faced by similar challenges that rationalize indiscriminate and increasing solid waste disposal.

The residents of Kiambu town reported a moderate awareness of the role of government participation when it comes to regulating solid waste management within the town. Actually, lack of public awareness of such public affairs is depicted as a challenge that most developing countries face. The public stands a high chance for not even knowing their environmental rights

and cannot even report violators of the existing laws. The challenge spans to embrace the fact that most people from this locality do not even know the existence of the law itself. The County and National governments have played a minimal role in sensitizing and educating people about the Waste Management Regulation, 2006 – especially its scope and limitations.

Therefore, it becomes impossible for the public to notice illegalities involved in contravening the Legal Notice. It can be deduced that there is no legal public program that allows synergistic relationship between the county authorities and the public. Public awareness about the existence of the regulation and the role of both the county and national government is a big opportunity for the success of public laws. With such a case in place, both the insufficient knowledge about the existence of the solid waste regulation and poor government participation can be tied together in explaining the preconceived thoughts from some of the residents that waste collection and disposal is exclusively a government role.

Public participation towards implementing sustainable solid waste disposal in Kiambu town is low. According to the compliance theory and the public policy framework, the public has a role to play when it comes to participating in supporting a regulation – and in this case, it is entitled to carry out several activities such as practicing proper waste collection within their environs and reporting illegal solid waste disposal and any other issue that compromise solid waste management. Very few residents reported to engage in domestic-level waste collection and treatment such as burning or hiring garbage waste collectors at a small fee. Considering the continued consumption rate among the residents, solid waste will be a salient problem if the residents are not sensitized to handle waste management.

Solid waste disposal through burning is depicted not to be sustainable because the residents do not separate or sort out the waste – indicating that harmful emissions are injected to the atmosphere. Another significant number of residents have organized small groups that voluntarily carry out solid waste disposal from their homesteads. However, a concern here is whether these residents are aware of the existing law and its functionality. Further, as much as, these residential home-based activities support sustainable waste disposal it is worth evaluating issues of inclusivity of all the residents – but in this town it is a challenge since a large proportion of public is not aware of the law.

The law has failed to deliver its expected outcome regarding minimizing solid waste disposal due to high public ignorance and poor government involvement. To add on this, enforcing the law becomes a challenge since the basic foundation of public knowledge about it is not available. The residents cited that the solid waste within the town is increasing and this has been attributed by insufficient waste collection resources within the sub-county. The few dustbins are located discriminately at some places within the sub-county. None of the participants claimed to have seen a county dumpsite or policies within the town directing the residents on strategic places on where to dispose their waste. Public funds are potential resources that the county would utilize to purchase sufficient waste collection equipment – but as with the current situation this is not the case. It seems that poor financial resources has challenged the county government to supply the town with the necessary sufficient solid waste collection materials. On top of this, the waste collection within the town is carried infrequently at least once in a week – and this may send a signal that the county government lacks man-power and capital resources to facilitate frequent waste collection.

The small portion of participants who acknowledged the existence of the law reported it as being stable. There were no significant legislations that were noted to influence the Legal Notice 121, 2006 from performing its expected tasks. However, its applicability in managing and regulating solid waste within the county was reported to be inconsistent following the biased and challenged by issues related to favourism – where the county waste collectors focus majorly on collecting waste from some commercial centers. Moreover, the capacity to solve disputes was reported to be effective by the small proportion of participants who knew about the law. There are no pending litigation disputes in various courts related to waste disposal. Lastly, NEMA is reported to not being fully involved or supportive regarding its expected roles in supporting and assisting the county authorities in implementing the solid waste regulations.

6.3 Theoretical and Policy Implications

Theoretically, the study adds knowledge to the existing literature about the legal challenges that many developing countries which impede proper sustainable waste management practices. Evaluating the Legal Notice No. 121 as how it applies within the Kiambu town gives a chance to assess how developing economies are affected by vague and incompetent laws. The study rationalizes how illegal dumping is related to ineffective laws that regulate waste management. Further, evaluating the environmental regulation using the eight indicators or dimensions as they apply to the Legal Notice No. 121, 2006 gives an opportunity for future researcher to adopt similar dimensions to assess public laws in other fields such as the transport, fishing, agriculture, and mining sectors to mention a few. The study signals a critique to the existing legal framework within the Kiambu town especially in managing solid waste. The Legal Notice No. 121 is ineffective and this tells that there is a need for adopting some legal or

structural changes to ensure that the law is fully supported and delivers the desired outcomes. There is also a need to adopt other policies that aim to support the enforcement level and create public awareness to boost the effectiveness of the law. Some of the major policy recommendations are discussed in Section 6.5.

6.5 Policy Recommendations

There are a wide array of policy recommendations that can be drawn from this study, these can be categorized as short-term, medium-term and long term as discussed below.

6.5.1 Short-term

The society or the residents of Kiambu town can get involved in sound solid waste management practices through engaging in community-based solid waste management campaigns or education and multiply their efforts towards home-based solid waste management practices in line with the requirements of the Waste Management Regulation, 2006.

6.5.2 Medium

The County Government of Kiambu needs to establish public education programs to sensitize and create awareness to the public on the legal framework that govern their activities and the effects to the environment.

The educational programs should come clear and teach the public on the different directives, policies, and regulations that govern waste emission and disposal within the county and how to treat policy issues that came along through the use media platforms available.

The three R principle (Reduce, Re-use and Recycle) should be highly encouraged and massive campaigns organized in order to encourage waste segregation at source. The County

Government of Kiambu could issues free dustbin that have been color-coded for ease of segregation.

The National government should consider increasing the county budget that can be channeled towards solid waste management and used for proper, efficient and sufficient solid waste management equipment and personnel to enforce the existing law.

The County Government of Kiambu needs to establish several sanitary Landfills as required by the regulation and increases its manpower for waste collection and sorting to ensure that solid waste goes to the right disposal designated areas – and is treated properly. This type of support acts as empowering the current county administrators to enforce the law amicably without any structural frictions.

6.5.3 Long-term

The County Government, and other environmental bodies within the county and town should work with the National Government to ensure that the law is stable and consistent. Such an aspect indicates that the county government has to propose some national level changes that would favor efficient solid waste management not only in Kiambu, but also across the country. For instance, there should be defined set of penalties accorded to the law violators with no room for bribery or favor.

An amendment to Legal Notice, 121 should be made to separate the handling of residential waste from other forms of various waste that have not been captured in the regulation with an aim of ensuring that all form of waste are properly managed, handled and disposed off in order to safe guard the quality of the environment.

6.7 Recommendations for Future research

A significant recommendation for future research in this field or topic would be adopting a different research design. The study adopted a qualitative inductive research and considering a quantitative approach may give it a different taste and direction. For instance, the study may be focused on the volumes (tons) of solid waste generated each year after the law was implemented and take a sample of years before the law was enacted and compare to assess if there are any change in the volumes of solid waste collected. Also, the study can assess the number of cases or disputes that have been solved within the town before the law and after the law was enacted – however the research may be affected by the quality of data accessed.

Another recommendation may be using one type of research instrument for consistency of the scale reliability – indicating that the research should consider either the county officials or the general public, but not the two at a go. Still, a more reliable and plausible scale needs to be adopted in assessing the items that define the effectiveness of the law. The Likert scale used in assessing the questions varied in some of the items – most of them adopted a 5-point scale while others adopted a 100-point scale. Consequently, the variance stands a high chance to influence the scale reliability (measured by Cronbach's alpha coefficient). A uniform scale is recommended for the future research. Lastly, a large sample is recommendable to generalize the study findings without any significant bias. Notably, concluding that developing countries have unstable and inconsistent environmental laws which compromise proper solid waste management may not be statistically correct since the findings are based on 80 responses.

References

- Aja, O. C., & Al-Kayiem, H. H. (October 01, 2014). Review of municipal solid waste management options in Malaysia, with an emphasis on sustainable waste-to-energy options. *Journal of Material Cycles and Waste Management: 16*, 4, 693-710.
- Baud, I., Grafakos, S., Hordijk, M. & Post, J. 2001, Quality of life and alliances in solid waste management: Contributions to urban sustainable development. *Cities*, 18, pp. 3-12.
- Climate Date Org. (2018) Climate Kiambu. Accessed from <http://en.climate-data.org/location/54317/>.
- Eden, S. (2016). Public participation in environmental policy: considering scientific, counter-scientific and non-scientific contributions. *Public understanding of science*.
- Ezeah, C., Roberts, C., & Phillips, P. (2010). *Evaluation of public health impacts of scavenging in Abuja, Nigeria using Q Methodology*. ISWA.
- Google Earth, 2018. Accessed from <https://www.google.com/maps/place/Kiambu/>
- Guerrero, L. A., Maas, G., & Hogland, W. (January 01, 2013). Solid waste management challenges for cities in developing countries. *Waste Management Pergamon Press-*, 33, 1, 220-232.
- Hardyman, W., Daunt, K. L., & Kitchener, M. (2015). Value co-creation through patient engagement in health care: a micro-level approach and research agenda. *Public Management Review*, 17(1), 90-107.
- Hogland, W. (January 15, 2013). Solid waste management challenges for cities in developing countries. *Waste Management*, 33, 1, 220-232.

- Hwa, T. (2007). Overview of solid-waste management in Asian countries. In Environmental Management Centre, ed. *Solid Waste Management: Issues and Challenges in Asia*. Vol 5(2), 334-336
- In Simelane, T., & In Mohee, R. (2015). *Future directions of municipal solid waste management in Africa*.
- Iskandar, L. K. (2003). Integrating local community-based waste management into international contracting. In proceedings of solid waste collection that benefits the urban poor, 9–14 March, Dar Es Salaam, Tanzania. Switzerland: The SKAT Foundation.
- Joardar, S.D., 2000. Urban residential solid waste management in India. *Public Works Management and Policy* 4 (4), 319–330.
- Karanja, A. 2005. Solid Waste Management in Nairobi: Actors, Institutional Arrangements and Contributions to Sustainable Development. PhD in Development Studies, Institute of Social Studies, The Hague, Netherlands.
- Kenyan Law. (2017). The County Governments (Amendment) Bill, 2013. Accessed from <http://www.kenyalaw.org/kl/index.php?id=3472>
- Kiambu.gov (2017). Waste Management: Kangoki Landfill. Accessed from <http://www.kiambu.go.ke/water-environment-and-natural-resources-blog/408-kangoki-landfill>
- Latham, (2013) accessed from https://drjohnlatham.com/wp-content/uploads/2013/12/2013_QMJ_P1.pdf
- Marshall, Martin N. (2006). "Sampling for Qualitative Research." *Family Practice* 13: 522–526.
- Marshall, R. E., Farahbakhsh, K., (2013) “System Approaches to Integrated Solid Waste Management in Developing Countries,” *Waste Management*, 2013, 33: 988-1003.

- Mayda, J. (2005). Environmental Legislation in Developing Countries: Parameters and Constraints. *Ecology Law Quarterly* Vol 12 – 4 pp. 997 – 1024.
- Moufang, R. (2012). *The Concept of Ordre Public and Morality in Patent Law*, in Geertrui Van Overwalle (Ed.), *Patent Law, Ethics*
- Nadzri, Y. & Larsen., I. B., (2012) “Federalising Solid Waste Management in Peninsular Malaysia,” Department of National Solid Waste Management. Malaysia.
- NEMA. (2006). Environmental Management and Co-ordination (Waste Management) Regulations 2006. Kenya Gazette Supplement No. 69.
- NEMA. (2015). The National Solid Waste Management Strategy. Kenya Vision 2030.
- Pinderhughes, R. (2004). *Alternative Urban Futures: Planning for Sustainable Development in Cities throughout the World*. Lanham: Rowman & Littlefield Publishers
- Ronald B. (2007). "Compliance Theory: An Overview" In Improving Compliance with International Environmental Law.
- Saunders, M; Lewis, P; Thornhill, A (2012). *Research Methods for Business Students* (6th ed.).
- Sharholy, M., Ahmad, K., Mahmood, G., & Trivedi, R. C. (January 01, 2008). Municipal solid waste management in Indian cities - A review. *Waste Management*, 28, 2, 459-467.
- Silverman, D. (2011). *Interpreting qualitative data*. (4th Ed.). New York: Sage Publications.
- Srivastava, V., Ismail, S. A., Singh, P., & Singh, R. P. (June 01, 2015). Urban solid waste management in the developing world with emphasis on India: challenges and opportunities. *Reviews in Environmental Science and Bio/technology*, 14, 2, 317-337.

- Srivastva, R. (2014). Waste Management: Developed and Developing Countries. International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064.
- The Law Society of Australia. (2015). Characteristics of an Effective Law: Student and Teacher Resource. Francis Burt Law Education Programme
- Thomas E. (2008). *Solid waste management: critical issues for developing countries*. Kingston: Canoe Press, Univ. of the West Indies.
- Tietenberg, T.H. and Lewis, L., 2016. *Environmental and natural resource economics*. Routledge.
- UNEP (2005) *Selection, design and implementation of economic instruments in the solid waste management sector in Kenya: the case of plastic bags*. United Nations Conference of Environment and Development. Geneva.
- UNEP. (2006). Waste Management Regulations, 2006. Legal Notice No. 121. Kenya Gazette Supplement No. 69.
- Zerbock, O. (2003). Urban Solid Waste Management: Waste Reduction in Developing Nations. (www.cee.mtu.edu). Accessed on 7th September, 2017.
- Zurbrugg, C., (2002). Urban Solid Waste Management in Low-Income Countries of Asia: How to Cope with Garbage Crisis. Scientific Committee on Problems of the Environmental (SCOPE), Durban, South Africa, Urban Solid Waste Management Review Session.

Appendices

Appendix i : Work Plan (Gantt chart)

	Jan 2017	Feb 2017	May 2017	June 2017	July 2017	Aug 2017	Oct 2017	Nov 2017	Feb 2018	May 2018	Aug 2018	Nov 2018
Choosing research topic												
Introduction /Backgroun d of topic												
Literature review												
Methodolog y-identify study area												
Research design												
Write final draft												
Defence proposal												
Data												

collection													
Data Analysis													
Expected output													
Writing final thesis draft													
Submission of thesis													

Appendix ii : Budget

	RESEARCH BUDGET
PROPOSED TITLE :	EFFECTIVENESS OF WMR, 2006 IN KIAMBU TOWN
STUDENTS NAME :	JIMMY OWITI
STUDENT REGISTRATION NO :	A06/87321/2016
EXPENSES	
CATEGORY 1 (TRAVEL)	
Item	Amount in Kshs.
Fuel Cost	5,000
CATEGORY 2 (RESEARCH EQUIPMENTS)	
Item	Amount in Kshs.
1 Cell Phone	8,000
Mobile Internet-Modem	3,500
Flash disk	1,000
A Laptop	30,000
CATEGORY 3 (RESEARCH MATERIALS)	

Item	Amount in Kshs.
Stationery (pens, makerpens, flip charts, printing papers)	5,000
Printing and Binding	2,000
Total expenditure	54,500

Appendix iii : *Study Questionnaire.*

The Effectiveness of the Waste Management Regulation, 2006 (Legal Notice 121) In Relation To Solid Waste Management In Kiambu Town.

Public participation questionnaire in Kiambu town

Dear sir/madam

I am a student at university of Nairobi, currently undertaking a Masters of science degree course at Wangari Mathai Institute for Peace and Environmental studies. I am conducting a research study in the field of solid waste management in Kiambu town. The research is meant to check on the effectiveness of the waste management regulation. As a residence in Kiambu town I would wish to request for your views in regards to the above subject matter.

A. Basic information

personal information/details:

Gender:

Age:

Educational level:

Occupation:

Area of residence:

B: Information on the waste management regulation: (For the 5-point scale, where 1 is the lowest and 5 is the highest, please circle the number of your choice)

6. How would you rate your awareness of the role of the National government and County Government of Kiambu in regards to solid waste management?

[1 2 3 4 5]

7. How would you rate the public awareness of the Waste Management Regulation, 2006?

[1 2 3 4 5]

Kindly, share with me the reason for your above choice

.....
.....

8. How would you rate your participation involvement as a local in Kiambu Town in solid waste management?

[1 2 3 4 5]

Kindly, share the rationale behind your choice above

.....
.....

9. How would you rate the level of enforcement of the waste management regulation in Kiambu town?

[1 2 3 4 5]

Kindly, share with me the reason for your above

choice.....

.....

10. How is the 2006 waste management regulation influenced by other legislations?

[1 2 3 4 5]

11. How would you rate the stability of this legislation in terms of regulating solid waste in the town?

[1 2 3 4 5]

Kindly, share with me the reason for your above choice

.....

.....

12. How would your rate the consistency of regulation regarding to its enforcement.

[1 2 3 4 5]

Kindly, share with me the rationale behind your choice

.....

.....

13. How would you rate the capacity of the Waste Management Regulation,2006 to resolve waste management disputes in Kiambu town?

[1 2 3 4 5]

Kindly, share with me the rationale behind your choice

.....
.....

14. How would you rate the level of involvement of the county government in relation to solid waste management in Kiambu town?

[1 2 3 4 5]

Kindly explain the rationale behind your choice, citing the roles that the county government does (if any) in relation to waste regulation

.....
.....

15. How would you rate the performance of the local community in control and management of solid waste?

[1 2 3 4 5]

16. How would rate the level of participation of National Environment Management Authority (Nema) in relation to solid waste management in Kiambu Town?

[1 2 3 4 5]

Kindly, share with me the rationale behind your choice

.....
.....

17. Overall, how would you rate the effectiveness of the waste management regulation, 2006 in addressing solid waste management? [1 2 3 4 5]

Appendix iv: Semi-structured interview Questions.

Semi structured interviews questions for government official in Kiambu Sub-county

A. personal information/details:

Age:

Gender:

Occupation:

Department:

B: information on the waste management regulation:

1. Based on a 5-point scale, how would rate your awareness of the role of the National government and County Government of Kiambu in regards to solid waste management?

Perfectly Aware	Aware	Neutral	Unaware	Perfectly unaware
1	2	3	4	5

Kindly, share with me the reason for your above choice.....

.....

2. Do you believe the regulation has been accepted by the following?

- a) County Government of Kiambu-Environment officers in the 12 sub-counties
- b) Public Health staff officer in Kiambu sub-county
- c) Nema officers
- d) The local community in Kiambu town.

Compliance & Enforcement

3. On a 100-point scale how would you rate the level of enforcement and compliance of the waste management regulation in Kiambu town

Excellent	good	Neutral	poor	Very poor
81-100	61-80	41-60	21 - 40	0-20

Are there any failures in its enforcements? Kindly share

briefly.....

Stability

4. Based on a 5-Point Likert scale, how would you rate the stability of this legislation in terms or regulating solid waste in the Kiambu town?

Very Stable	Stable	Neutral	Unstable	Very unstable
1	2	3	4	5

5. Do you feel that it overrides or compromises with other legal aspects (or laws) related to other environmental sectors such as agriculture?

Response	Tick appropriately	Rationale
Yes		
No		

Consistency

- 6. Is the regulation being implemented in a consistent way in Kiambu town?
- 7. Are there legal aspects that the law overlooks or are there organizations or business units exempted by the law?

Public awareness

- 8. Is the local community in Kiambu town aware of the regulation? How has the administration communicated this regulation to the public?

Ability to settle disputes

- 9. On a 100-point scale how would you rate the capacity of the waste management regulation, 2006 to resolve waste management disputes in Kiambu town?

Excellent	good	Neutral	poor	Very poor
81-100	61-80	41-60	21 - 40	0-20

- 10. On an estimate, how many legal disputes have you solved since the implementation of this law? Out of these, are there any pending disputes that have not been settled? If so why?

Approximate disputes solved	Unsolved disputes	Rationale

Role of government & community

- 11. On a 100-point scale how would you rate the level of involvement of the county government in relation to solid waste management in Kiambu town?

Excellent	good	Neutral	poor	Very poor
81-100	61-80	41-60	21 - 40	0-20

Kindly explain the rationale behind your choice, citing the roles that the county government does (if any) in relation to waste regulation.....

.....

12. What are the roles of the local community in Kiambu town in relation to solid waste management? What challenges do you encounter from the community in terms of implementing this regulation?

Role of NEMA

13. What is the role of National Environment Management Authority (Nema) in relation to solid waste management in Kiambu Town? Do you think NEMA has failed in any way in terms of enforcing this law?

Effectiveness

14. In your view, do you think the waste management regulation, 2006 is effective in addressing the solid waste problem in Kiambu town? If so, how would you rate, the overall effectiveness of the waste management regulation, 2006 based on a 100-point scale?

Excellent	good	Neutral	Poor	Very poor
81-100	61-80	41-60	21 – 40	0-20