Influence of Stakeholder Participation on Domestic Waste Management in Biashara Residential Area, Kiambu County, Kenya

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DECLARATION AND APPROVAL

Candidate's Declaration

This thesis is my original work and has not been presented for a degree in any other university or any other award.

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Approval by Supervisors

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DEDICATION

This thesis is dedicated to my parents, Mr. Ndururi Kabuga Maigua and Mrs. Margaret Muthoni Ndururi and my two siblings, Maureen Wambui Ndururi and Martin Maina Ndururi. I am eternally thankful to my parents, my sister and my brother, for their prayers, encouragement and financial support throughout my studies. May God Bless you richly.

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LIST OF ABBREVIATIONS AND ACRONYMS

DWM refers to Domestic Waste Management.

ISWM refers to Integrated Solid Waste Management.

NACOSTI refers to National Commission for Science, Technology and Innovation.

NEMA refers to the National Environmental Management Authority.

NGO refers to Non- Governmental Organizations.

SWM refers to Solid Waste Management.

ABSTRACT

Researchers have found that to achieve efficient and sustainable solid waste management, it is important to involve all stakeholders in the process. This study was conducted to investigate the influence of stakeholder participation on domestic waste management in Biashara residential area, Ruiru sub-county Kiambu County, Kenya. The study had the following objectives: To establish the influence of stakeholder participation strategies on domestic waste management, To determine the influence of stakeholder forums and communication practices on domestic waste management, and To examine the influence of stakeholder engagement frequency on domestic waste management. The study utilized cross-sectional descriptive research design and a sample of 383 respondents was utilized, data was collected using questionnaires and interview guides and analysis was done using SPSS version 23. The study established that majority of the residents (59%) are empowered to recycle and separate their waste and that there is a strong positive correlation between stakeholder's empowerment to recycle their waste and improved DWM ($r=0.539$, $n=342$, $p=0.01$). On waste storage, the results indicated that there is a significant positive correlation between stakeholder consultations on appropriate waste storage techniques and improved DWM ($r=0.328$, $n=342$, $p=0.01$). In terms of waste collection, the study deduced that stakeholder negotiations are sometimes held to designate waste collection days and that there is a very strong and significant positive correlation between adherence to negotiated waste collection days and improved domestic waste management ($r=0.838$, $n=342$, $p=0.01$). On waste transport and disposal, the study established that, 38.6% and 42.7% of the respondents respectively agree that partner and tenant meetings are held. Additionally, the study deduced that there is a significant strong positive correlation between adequacy of partner meetings and improved DWM ($r=0.491$, $n=342$, $p= 0.01$) and a significant moderate positive correlation between the adequacy of tenant meetings and the improvement of DWM ($r=0.317$, $n=342$, $p=0.01$). Finally, the study determined that there is no significant correlation between stakeholder engagements carried out multiple times a year and improved DWM and that the correlation that exists is negative ($r= -0.077$, $n=342$, $p=0.157$) while there is a mild and significant positive relationship between stakeholder engagements carried out annually and improved DWM ($r=0.197$, $n=342$, $p=0.01$). The study concluded that overall, there is a significant positive correlation between stakeholder participation in DWM and improved DWM and recommended a significant increase in stakeholder participation in DWM and further studies into ways of enhancing stakeholder participation in DWM.

CHAPTER ONE: INTRODUCTION

1.0 Introduction

This chapter focused on the background to the study, statement of the problem, purpose of the study, research objectives and questions, the significance and the conceptual framework. It also provides a list of operational definition of terms.

1.1 Background of the study

Domestic waste management is a challenge in rural and urban areas across the world. Every individual is a potential generator of waste and therefore a contributor to the problem. Globally, waste generation rates are increasing with accelerated population growth and urbanization and domestic waste is one of the by- products urban life and growing at a faster rate than urbanization itself. In 2016, the worlds' cities produced 2.01 billion tonnes of solid waste, amounting to a footprint of 0.74 kilograms per person per day (World Bank, 2016). Managing waste is vital for creating sustainable and habitable cities but challenges abound in the execution of this important task and achieving sustainability in waste management requires an integrated approach (Visvanathan *et al*., 2004).

In Thailand, the waste produced in 2016 in the city of Bangkok was projected to be around 4.21 Mt translating to 16% of the total waste generated in the country. However, according to Vassanadumrongdee & Kittipongvises, (2018) waste management strategies in Bangkok including use of 3Rs, enhanced waste assembly system and community focused solid waste management are not bearing fruits due to minimal community participation in source separation of waste. Further, a comparative study focusing on community solid waste management in eight major cities throughout China carried out in the year 2000 concluded that kitchen waste and recyclables should be separated at the source thus stakeholder involvement was found to

play an important role in MSWM (Tai *et al.,* 2011). The study also cited enhancement in law, organization mechanisms and civic education as problematic issues that needed to be addressed.

Likewise, according to a study conducted by Kaseva & Mbuligwe, (2005) in East African urban councils, residential areas or households are the major contributors of solid waste but the collection and disposal by the council is not effective. Waste collection was singled out as one of the aspects of DWM consuming a big chunk of the waste management budget especially in developing countries largely due to indiscriminate dumping. Kurian, (2006), found that the community plays a central role in sustainable SWM as households comprise the largest grouping of stakeholders in waste management and indicated that the problem of indiscriminate dumping could be addressed through community participation in source separation and door to-door collection. In Uganda, Mukisa, (2009) in a study done in Kira Town Council determined that the majority proportion of the public in Kira Town Council exhibited concern and an amount of sensitivity about solid waste though sorting of solid waste is less adopted. The study also found that there are challenges of limited resources to manage the solid waste and illegal dumping in Kira Town Council. Overall, the study found that the level of public participation in solid waste management at present in Kira Town Council is low and that the best way to start dealing with the problem is for the Town Council authorities to show the people that they are worth by involving them in the initial planning process (Mukisa, 2009).

In Kenya, some of the challenges identified in domestic waste management include lack of enforcement plans to oblige waste producers to pay for waste management services especially households, apathy from households given that it has always been responsibility of county council/government to manage waste and lack of proper equipment for waste management,

(Monyoncho, 2013). Further, a qualitative study conducted in Makina informal settlements of Kibera slums in Nairobi to assess the household management of domestic solid waste found that Makina residents have inadequate capacity to handle solid wastes generated from their households and the practice of the 3Rs: Reduction, Reuse and Recycling of the domestic solid waste was barely there. The study identified various opportunities that exist in Makina area for improvement of the current situation including community training how to reduce, reuse and recycle DSW which only 7% of the respondents had knowledge on as well as enforcement of waste management by-laws by the Nairobi County Council. The study also recommended consolidation of the efforts of all stakeholders handling DSW in Makina such as the Makina residents, civil societies, international organizations, Private Firms and the Local Government into an integrated approach of waste management (Mwangi, 2011). Further, according to Muthoni, (2014), the major cause for the sustained rise in unmanageable SWM in Nairobi is basic social factors such as trust, accountability, communication and commitment breakdown amongst the stakeholders.

Overall, research has determined that effective domestic waste management requires an all-inclusive approach that combines infrastructure development, health promotion, and community contribution in solid waste management processes to improve the shortfalls to ensure quality sanitation (Amoah & Kosoe, 2014; Aarne, *et al.*, 2002). Stakeholder participation is a significant element of contemporary solid waste management and emphasizes community consultation, raising awareness and active participation in decision-making for solid waste management (Adongo et al., 2015). This study was therefore undertaken to determine the influence of such stakeholder participation on domestic waste management in Biashara residential area, Kiambu County Kenya.

1.2 Statement of the Problem

Management of household waste in the urban centers continues to be a major due to the fast-growing population. In residential areas in Ruiru, open dumping sites continue to emerge due to rapid urbanization and population growth despite the county government's efforts in waste management.

Njogu *et al*., (2014) established that poor solid waste management is significant in Ruiru where some wards do not receive services from the municipal council frequently leading to buildup of wastes in the open dumpsites. The study proposes that the municipality should underscore the importance of building public-private partnerships for enhanced DWM. The study also recommends that the municipal council should also work on intensifying the existing partnerships with the private companies and provide more garbage collection and recycling services. Further, Njuguna, (2016) echoes this in his study in Gitambaya Village, Ruiru that established that community participation in domestic waste management as practiced by households and business operators is limited; hence further compounding solid waste menace.

The common theme among these identified studies was the acknowledgement that effective domestic waste management is linked to stakeholder participation in the process. However, these studies do not elaborate how stakeholder participation influences the domestic waste management process. This study therefore sought to fill that gap by establishing the relationship between stakeholder participation and effective domestic waste management.

1.3 Purpose of the Study

The purpose of this study was to investigate the influence of stakeholder participation on domestic waste management in Biashara residential, Ruiru subcounty Kiambu county, Kenya.

1.4 Research Objectives

The specific objectives of the study were:

i. To establish the influence stakeholder participation strategies, have on domestic waste management in Biashara residential area;

ii. To determine the influence of stakeholder forums and communication practices on domestic waste management in Biashara residential area and;

iii. To examine the influence stakeholder engagement frequency has on domestic waste management in Biashara residential area.

1.5 Research Questions

The research questions guiding the study were:

i. To what extent do stakeholder participation strategies influence domestic waste management in Biashara residential area?

ii. How do stakeholder forums and communication practices influence domestic waste management in Biashara residential area?

iii. To what extent does the frequency of stakeholder engagement influence domestic waste management in Biashara residential area?

1.6 Significance of the Study

The foundation of stakeholder participation in domestic waste management is based on the fact that every person produces waste and can be affected directly and indirectly if the waste is not well managed. It is largely viewed that waste management is the singular duty and obligation of local authorities, and that the public is not expected to play a part (Vidanaarachchi *et al.,* 2006).

Nevertheless, researchers have found that functioning effectiveness of solid waste management depends upon active involvement of both municipal agencies and citizens. Sharholy *et al.,* (2008) cite individuals partaking in decision making as critical in efficient solid waste management and point out lack of community awareness and societal indifference as factors contributing to lack of solutions in solid waste management.

The findings of this study can be of significant benefit to residents, traders and landlords, the county environmental officers, as well as the private organizations involved in domestic waste management to give them a better understanding of the role, they can play in domestic waste management and the influence it would have on the domestic waste management process.

The findings of this study on stakeholder participation strategies may be applied within the county government environmental offices to enable them update their information the forms of stakeholder participation strategies that may be more effective for domestic waste management in Biashara area. The findings on the influence of stakeholder communication practices may assist county government to discover the gaps in the communication about domestic solid waste management and fill them appropriately.

Findings about the influence of stakeholder forums on domestic waste management may be utilized by the county government, the private waste collectors, the residents, landlords and the traders in helping to improve the functioning of stakeholder forums so as to better their outcomes. Additionally, the findings on the extent to which the frequency of stakeholder engagement influences domestic waste management in Biashara residential area will be useful to the county government, the private waste collectors, the residents, landlords and the traders in coming up with a realistic schedule for waste management.

1.7 Conceptual Framework

The conceptual framework for this study is illustrated in Figure 1.1 and was based on stakeholder participation reflected through stakeholder participation strategies, stakeholder forums, stakeholder communication practices and the frequency of stakeholder engagements which constitutes the independent variables and domestic waste management which is the dependent variable. The intervening variables for this study were government policy, level of education and the cost of domestic waste management.

Stakeholder participation is the process by which community members (individuals and households) shoulder the obligation for their own health and safety and develop the capacity to contribute towards the same. Stakeholder forums are employed for stakeholder involvement their goal being the same, that of influencing a number of outcomes in a process through communication and relationship building. Communication is an important prerequisite for stakeholder participation. Diffusion of information plays a crucial role in solid waste management. Stakeholder engagement is the process used to engage relevant stakeholders to achieve accepted outcomes. The frequency of stakeholder engagement has an effect on the effectiveness of DWM. Stakeholder participation being a continuous process the frequency of participation varies from project to project.

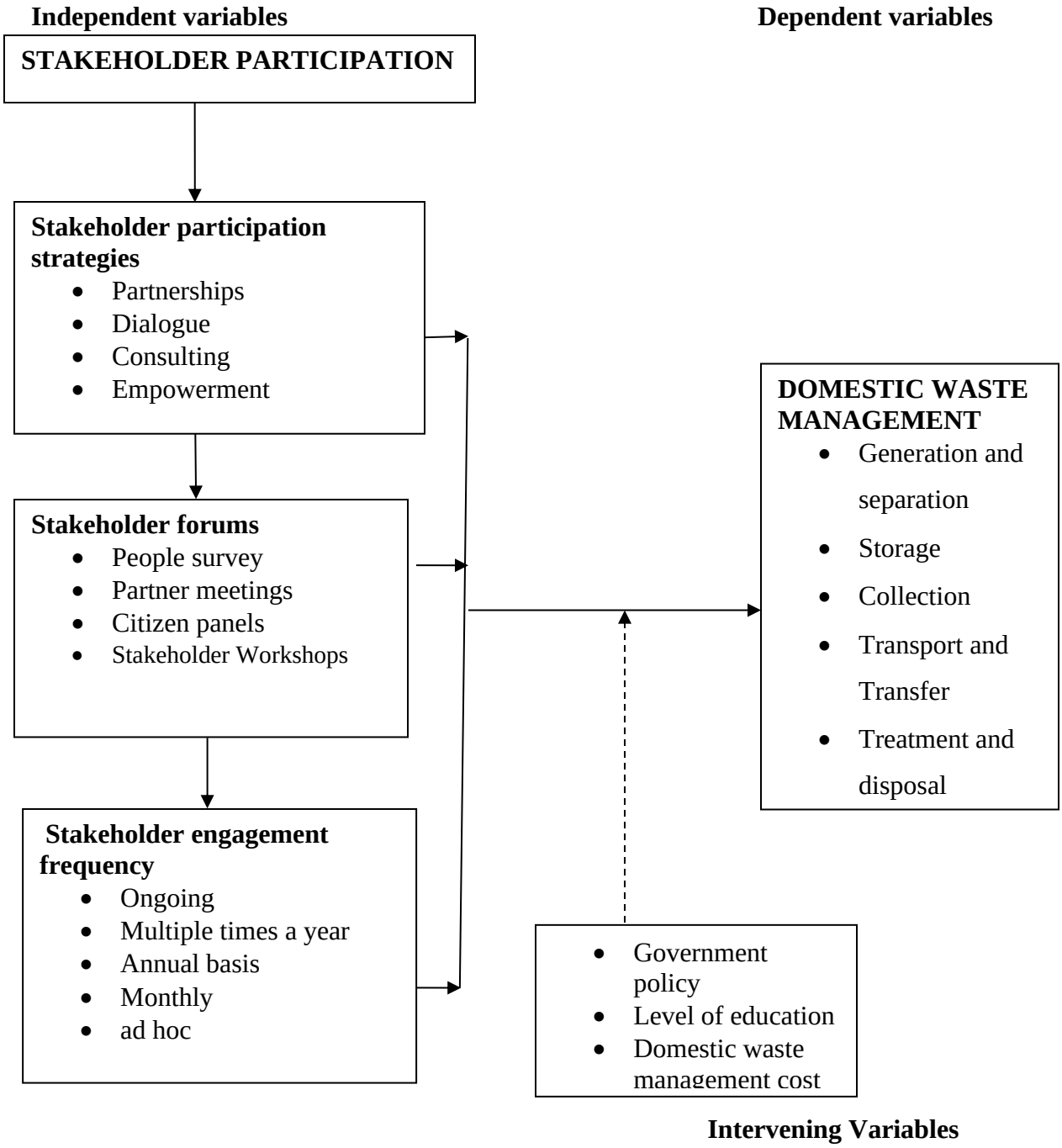


Figure 1.1: The Conceptual Framework of the Present Study
Source: Researcher (2016)

1.8 Operational Definition of Terms

Domestic Waste- This is waste collected and treated by, or for municipalities. It covers waste from households, including bulky waste, similar waste from commerce and trade, office buildings, institutions and small businesses, yard and garden, street sweepings, contents of litter containers, and market cleansing.

Domestic Waste Management- Domestic Waste Management includes the collection, transfer, resource recovery, recycling, and treatment of waste. The main target is to protect the population health, promote environmental quality, develop sustainability and provide support to economic productivity.

Stakeholders refer to those who participate in decision making process including those possibly affected by the decision. Stakeholders are the groups who are vital to the survival and success of the organization.

Stakeholder Participation is "the action or fact of partaking, having or forming a part of". Public participation is a political principle or practice and may also be recognized as a right (right to public participation). It seeks and facilitates the involvement of those potentially affected by or interested in a decision. It implies that the public's contribution will influence the decision.

Waste generation refers to the production of waste.

Waste handling covers the action of dealing with the waste (sweeping, tidying and clearing) after generation and prior to final disposal.

Waste storage refers to the action of accumulating and piling of rubbish before disposal.

Waste collection and transportation refers to the action of removing the waste from the household with the intention of final disposal.

Waste final disposal refers to the methods used by the households to get rid of their wastes, such as burning, burying, landfill and others.

Integrated Domestic Solid Waste Management System refers to a wide-ranging and environmentally responsive framework for handling municipal solid wastes giving precedence to decrease of MSW at source, recycling and reuse.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter discussed the literature from previous studies related to this study. The chapter covers an overview on stakeholder participation in DWM, the concept domestic waste and the domestic waste management process. The chapter also covers the theories that informed this study which are the stakeholder theory and the theory of waste management.

2.1 Stakeholder participation strategies in Domestic Waste Management

According to the UN-Habitat, (2010) municipalities have in the recent past come to the realization that they cannot successfully collect and remove waste without active participation and cooperation from community members who are the service users. As such there is a broad agreement that integrated solid waste management is the future as it provides the important intersection between the stakeholders, the elements and the sustainability aspects of a successful waste management system. ISWM is designed to improve the performance of solid waste system and to support sound decision-making by helping municipalities and other stakeholders to understand how the different parts of the system relate to each other.

In the ISWM, a stakeholder is a person or an organization that has a stake, or an interest in waste management (UN-Habitat, 2010). The municipalities, whose general responsibility is urban cleanliness and the citizens or households who use the system, are (almost) always stakeholders in waste management. Other stakeholders differ from city to city, so they need to be identified in the local context and often also grouped according to their interests. The private sector organizations involved in providing any waste management service and any other organizations that provide any funding for the ISWM (local and national government, NGOs, aid agencies) are also stakeholders.

In ISWM, Influencing Factors are a set of tools to be used by municipal managers to perceive, study and balance priorities and create measures to give the desired results. The EPA, (2012) outlines institutional factors, fiscal factors, technical factors, environmental factors as well as social factors as the factors that influence the selection, operation and effectiveness of any waste management scheme.

Here, Institutional factors are the legislations, processes and policies that allow the government to properly implement ISWM. It should be ensured that a country has passed laws and established a national policy on solid waste management standards and practices. Further the roles and responsibilities of each stakeholder should be spelt out and local authorities equipped with resources to implement the ISWM plan.

Fiscal factors refer to the cost of implementing the various waste management activities. The sources of funding both the short-term and long-term aspects of ISWM should be identified. Technical factors are those that relate to location and equipment to be used in waste management and they include projected waste generation, geological factors, transport distances and equipment as well as training necessary to perform waste management activities.

Environmental factors focus on the effects of waste management on land, water and air. They also relate to pollution control and public health concerns. Compliance with national standards should be monitored to ensure health risks are minimized and the environment is conserved. Finally, social factors relate to local customs, religious practices and public education as regards waste management. Citizen participation in all phases of waste management planning should be encouraged to help gain community awareness, input and acceptance.

This model was adopted because of its integrated approach to waste management; its recognition of the role of various stakeholders/ the public in the sustainable management of waste. This is

important in analyzing the waste management system which is the intention of this study with particular regard to stakeholder participation in solid waste management.

Stakeholder participation in solid waste management takes various forms. According to Asnani and Zurbrugg, (2007) community involvement may be carried out through consultation where those in power hear from community members, business owners and industries on the type and frequency of services they desire, their willingness to pay for the desired services and at what frequency and their commitment and willingness to take part in decision making regarding waste management aspects like collection, transport, treatment and disposal.

In the United States of America, laws have been put in place in various states to involve stakeholders in waste collection, recycling and re-use especially of electronic items through engagement with them. According to Kahhat *et al.,* (2008), in Washington producers of computers, laptops and televisions are required to offer recycling services to their customers by the Electronic Product Recycling Law put in place in 2006. According to Adongo *et al.,* (2015), in Tamale Ghana, all-inclusive collaboration between stakeholders in the management of waste in the area improved waste management by bringing innovations like adding value to waste by turning it into fertilizers and partnerships among stakeholders were found to promote information flow. In terms of communication, Mbeng, Phillips & Fairweather, (2009) cite flow of information as important for the implementation of the 3Rs, waste deterrence and composting among people. Another element of stakeholder participation in waste management is through partnerships between authorities and private entities. In Nairobi, Kenya, Public-Private co-operation in waste management was initiated in 1997 by the then City Council of Nairobi focusing on garbage collection, sweeping of streets and transportation of waste to Dandora

dumpsite by hired waste handlers, this was found to improve waste collection by 40% to 90% (Njoroge, Kimani & Ndunge, 2014).

2.2 Stakeholder Forums and Communication Practices in Domestic Waste Management

According to Tauhid-Ur-Rahman, (2006) majority of community members are prepared to play a role in order to improve DWM and agree that their involvement is important for enhanced DWM and general setting of a locality. Public hearings, public meetings and workshops are some of the most widely used forums for public involvement. Public meetings gather varying stakeholders to interact with an audience in information sharing and conversation at any point of public involvement with the aim of cultivating a feeling of community and building consensus (EPA, 2017). By their nature public meetings tend to be informal with no explicit agenda except for providing stakeholders a platform to hear from one another. Out of public meetings which usually bring together large groupings of people, smaller dialogue meetings or focus group discussions may be carried out by a few like-minded stakeholders. According to the Urban Environment Thematic Group, (2004), advisory groups and task forces may also be used as forums for public involvement. Advisory groups are beneficial in giving the stakeholder's views throughout a process and provide a chance for consultations between key stakeholders to ensure that reliable information comes out of advisory group sittings.

In America, Los Angeles County Solid Waste Management Committee/Integrated Waste Management Task Force, (2019) reports of monthly taskforces meetings comprising of local government representatives, SWM and recycling industry partners, community members and business owners that look into solid waste management issues like facilities expansion and to hear views from each stakeholder. According to IGES (2018), a focus group discussion (FGD) on Development of National Strategy to Reduce Short-Lived Climate Pollutants (SLCP) from

Municipal Solid Waste Management (MSWM) in the Philippines, (2018) came up with recommendations for the draft National Strategy on the same. In Nkulumane Suburb of Zimbambwe, Sinthumule & Mkumbuzi, (2019) in their study on participation on community-based solid waste management found community meetings as some of the forums through which stakeholders take part in SWM. Though the community meetings were found to be low-priority for the community members, the county council admitted to using such meetings for awareness campaigns. In Nairobi, Community Based Organizations and Youth Groups involvement commenced in 1994 and workshop consultations have been held periodically in the county government of Nairobi with various stakeholders to discuss waste separation at source, waste collection, treatment and recovery and waste collection (Karanja, 2005).

In terms of communication practices, Asnani and Zurbrugg, (2007) say that community involvement may be carried out through consultations where those in power hear from community members, business owners and industries. Authorities learn, the type and frequency of services desired by stakeholders, their willingness to pay for the desired services and at what frequency and their commitment and willingness to take part in decision making regarding waste management aspects like collection, transport, treatment and disposal. According to the EPA, (2010) community involvement is an essential element of the decision-making process for the setting up of waste management and recycling facilities. In Japan's Ulsan Northern District, the problems around the construction of a food waste recycling facility were fixed consensually using a participatory decision-making tool known as the citizens' jury (Eun, 2016). Consensus building was one of the communication methods used to establish trust between stakeholders. Petts, (1995) advocates for consensus building and citizen panels to address the challenges arising from the not-in -my-backyard phenomenon common in waste management. Consensus-

building is meant to enhance the value of community involvement by empowering the communities to take a proactive role in decision making. In A Case Study of Community Involvement and Consensus-Building in Hampshire, Communal disapproval to the placement of waste facilities was partly explained by a failure to directly involve people in essential policy decisions about waste management (Petts, 1995; Hasan, 2004). According to Hasan, (2004) in his paper Public Awareness is Key to Successful Waste Management the public must be made aware of waste management issues to understand the significances of inappropriate management of waste and how it may eventually pose a serious risk to their lives and well-being. Further, Eun, (2016) posits that a constant flow of information to and learning by the stakeholders through deliberating on specific issues (through a focus group interview, regulatory negotiation, a citizen jury, or planning cells) or general ones (through public polling, a citizen advisory committee, or a consensus conference) is an essential requirement for participatory decision-making.

2.3 Domestic Waste Management and Stakeholder Participation

Domestic Waste means waste generated from residences (EMCA, 2006). It consists mainly of biodegradable waste which is food and kitchen waste, green waste paper and non-biodegradable such as plastics, glass bottles, cans, metals and wrapping materials. There are varying types of waste that are categorized as domestic waste. Jouhara *et al*., (2017) identify domestic waste as follows in different countries: In the USA, majority of the domestic waste comprises of paper, followed by food residue and plastics. Other materials comprising of domestic waste are food waste, yard trimmings, rubber, leather, textiles, metals, wood waste and glass. In the UK, majority of domestic waste comprises of food waste, garden waste, wood and furniture, paper and card, glass, metals, plastics and textiles. In China as well, the largest portion

of domestic waste is made up of food residue. Other forms of domestic waste are non-combustibles, rubber, plastics, textiles, paper and wood waste. In India, the typical composition of domestic is largely food and garden waste, followed by paper, textiles, glass and ceramics, plastic / rubber and metal (Mishra *et al*., 2014).

According to Jerie & Tevera, (2014), the major components of the waste generated in the informal sector of Gweru, Zimbabwe includes food and vegetable wastes. Other non-biodegradable waste in the area includes paper, metal, textiles, rubber and leather products. In Arusha Tanzania, solid wastes include domestic garbage which consists of degradable food wastes, leaves, dead animals, and non-degradable waste such as plastics, bottles, nylon, industries and commercial waste (Yhdego & Kingu, 2016). In Kenya, domestic waste comprises largely of organic material, paper, plastics, glass and metal and textiles. In Thika, Mugo *et al.*, (2015), found that majority of the waste consisted primarily of four components: paper, plastic, organics and food. Food accounted for 15.51%, paper 18.31%, plastics 17.89% and organics other than food 16.51% respectively obtained at 95% confidence level.

Domestic waste management can be described as a mechanism associated with the control of generation, storage, collection, transport, processing and disposal of solid wastes in a way that favors the best interests of public health and takes into considerations environmental concerns. The management of solid waste is a process that has six key elements namely; Waste generation, Waste storage, Waste collection, Waste transfer and transport, Waste processing and recovery and Waste disposal. These elements are interrelated as illustrated in Figure 2.1. Waste generation encompasses those activities in which materials are identified as no longer being of value and are either thrown away or gathered together for disposal. The World Bank, (2012), estimates that by 2016 the rate of waste generation globally was 2.1 billion tonnes per

year. The rates of waste generation however vary from region to region with Sub- Saharan Africa generating 62 million tonnes per year which translates to an average of 0.65kg per person per day of waste and East Asia and the Pacific Region is approximately 270 million tonnes per year. NEMA estimates that in Kenya, the waste generation rate in major towns is 2400 tonnes/day in Nairobi, 250 tonnes/day in Nakuru, 400 tonnes/day in Kisumu, 140 tonnes/day in Thika, 600 tonnes/day in Eldoret and 2200 tonnes/day in Mombasa (NEMA, 2014).

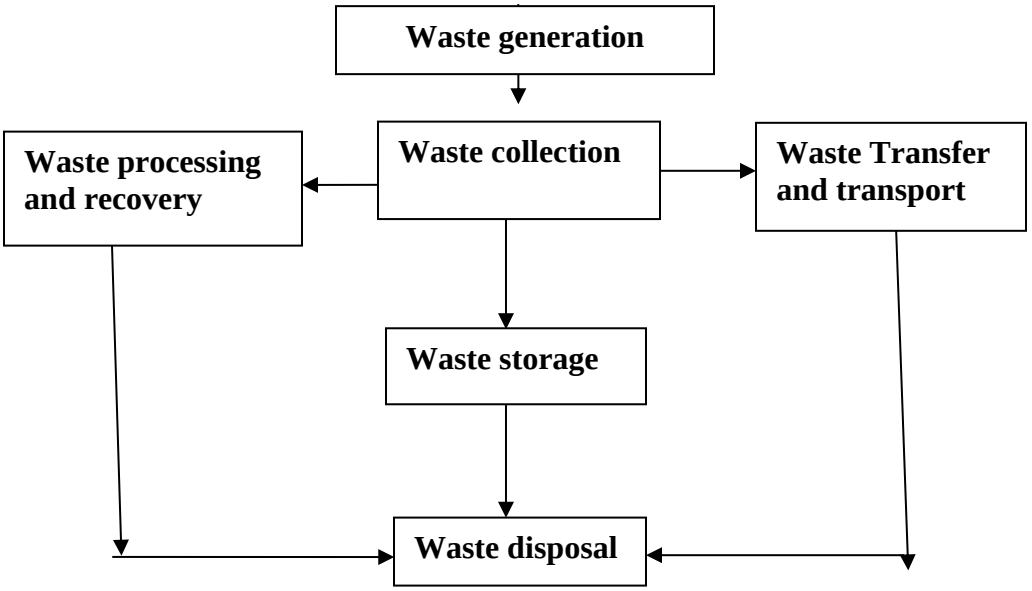


Figure 2.1: Interrelationships of the Elements of Solid Waste Management.
Source: Researcher (2016)

Waste Storage means temporary placement of waste in a suitable location or facility where isolation, environmental and health protection and human control are provided in order to ensure that waste is subsequently retrieved for treatment and conditioning and/or disposal, (EMCA, 2006). An important element of waste storage is the processing and recovery of waste. It involves separation of waste which is the segregation of hazardous waste from non- hazardous

waste. Separation of waste is enhanced when residents share responsibility with the municipality on the decision making on the waste system of the city (Guerrero *et al.,* 2013).

Waste collection is the collection of solid waste from the point of production (residential, industrial commercial, institutional) to the point of treatment or disposal, World Bank, (2012). The World Bank cites the following several methods of waste collection including; house-to-house where waste collectors visit each individual house to collect garbage. The user generally pays a fee for this service, community bins where users bring their garbage to community bins that are placed at fixed points in a neighborhood or locality the waste is then picked up by the municipality, or it's designated, according to a set schedule. Further, waste can be self-delivered directly to disposal sites or transfer stations, or hire third-party operators (or the municipality) or businesses can hire firms (or municipality with municipal facilities) who arrange collection schedules and charges with customers. Municipalities often license private operators and may designate collection areas to encourage collection efficiencies. According to Coad, (2011) experience has repeatedly shown that it is necessary not only to inform the public of arrangements for waste collection, and to educate them regarding the correct ways of dealing with waste, but that it is also important to involve the public in the planning of issues that affect them, such as the type of collection service, the frequency of collection, the provision and location of storage containers and the charges that must be paid for various levels of service.

After collection of waste it is transferred and transported to the final disposal site. These involves two steps where waste is first moved from smaller collection vans to bigger transport equipment and secondly where the contents of the larger vehicles are transported over extended distances to their final disposal sites (Tchobanoglous & Kreith, 2002). Domestic waste may be transferred using direct- load transfer stations wherein waste is loaded directly to the vehicle

that will transport the waste to its final disposal site or using storage- load transfer stations wherein once the waste is loaded it may be removed to sort out the recyclable waste.

Waste processing and recovery is also carried out in some instances. Recycling and composting have been established as some of the best, efficient and effective methods of solid waste processing and recovery. In Kenya's public technical training institutions, recycling is mainly done in the workshops where the metal and wood used in demonstrations are recycled for other relatively similar experiments requiring their use. Vegetable and food remains are used as animal feeds (Gakungu *et al.,* 2012). Only high value recyclables such as cans, bottles paper, cardboards find their way to recycling firms. In low income areas, recyclable materials are used and reused for domestic purposes and only thrown away when they are no longer of any use to the owners. According to Kamunyori, (2013) only about 27% of the solid waste generated daily makes it to the Dandora dumpsite and only 5% of it is recycled explaining the multiple mini-dumpsites found along the city's roads and in open spaces. Composting which is the process of turning organic waste into fertilizer through aerobic fermentation is another of the commonly used method of waste disposal in Kenya. According to Muindi & Mberu, (2017), 63.9% of household in Mombasa and 76.9% of households in Nairobi are aware of composting as of organic household waste but only 1.8% of households in Nairobi and 5.6% of households in Mombasa practice it. Other methods of waste disposal identified include dumpsites, rivers, pits and burning. According to Muindi & Mberu, (2017) 31.2 % of households in Mombasa and 13.6% of households in Nairobi take their garbage to dumpsites.

Domestic waste disposal which is the final stage of DWM may be carried out in varying methods. According to Muniafu & Otiato, (2010) controlled dumping is one of the methods used for domestic waste disposal in Nairobi Kenya specifically, the Dandora dumpsite. Recycling is

another method of waste disposal which involves collecting and processing recyclable materials, manufacturing of the recycled materials and finally purchasing of recycled products is another domestic waste disposal method.

2.3.1 Stakeholders' Roles in Domestic Waste Management

Previous researchers identified the people or stakeholders or organizations which may have an interest in sufficient waste management. The stakeholders are local and national government municipalities; city corporations; non-governmental organizations (NGO's); households, private contractor; Ministries of Health and Environment (Sujauddin et al., 2008; Shekdar, 2009; Zohoori & Ghani, 2017). The authorities, local and national municipalities, are largely responsible for the Waste Collection in the waste management chain. According to Caniato, Tudor & Vaccari, (2015), in the Gaza Strip, the Ministry of Health was found to be the most important stakeholder, followed by municipalities and solid waste management councils. The constitution of Kenya (2010) guarantees the right to a clean and healthy environment for all Kenyan where one of the functions of counties is solid waste management. Due to the poor state of affairs regarding the existing waste management facilities within the 47 Counties, NEMA developed thirteen minimum points for management of the existing waste management facilities so as to continuously promote compliance in waste management within the counties (NEMA, 2014). The requirements are based broadly on waste collection, waste transportation, waste disposal sites and licensing requirements. The law requires that municipal councils designate the official council disposal site(s), secure the site with a fence and a gate manned by a council official to control dumping and spread of waste outside disposal site as well as weigh or estimate and record the amount of incoming waste in tones. Further, municipal councils are

required to obtain licenses for their waste transportation vehicles and have licenses to operate the waste disposal sites.

The public or the community according to Kurian, (2006) participates in waste management through source separation and reduction, collaboration with municipalities and authorities in picking out waste management services and in paring for the identified waste management methods. In Nkulumane Suburb, Bulawayo, Zimbabwe, community participation encompasses waste separation in households, giving such waste to the waste collector and composting of organic wastes to be used as the fertilizer effectively turning waste to resources (Sinthumule & Mkumbuzi, 2019). The participation of NGOs and CBOs in waste management being a relatively new concept has not been well documented. However, Singh & Dey, (2015) in their study on the role of NGOs in Mainpur, India concluded that the city authorities should collaborate with the public, NGOs and Community Based Organizations (CBOs) to ensure public involvement such as regular meetings with local resident welfare associations. In Kenya, Mwangi, (2011) conducted a study on household solid waste management in Makina informal settlements, Nairobi and cited the roles of the various stakeholders in waste management as Self-Help groups, Community Based Organizations and Non-Governmental Organizations (NGOS) that were involved in waste separation, collection, transport and disposal.

2.4 Stakeholder theory

This study was guided by the stakeholder theory which was first published in 1984 by R. Edward Freeman (Mitchell *et al*., 1997; Frooman, 1999; Heidrich *et al*., 2009). The theory is mostly employed in organizational management and business ethics to refer to morals and values when managing an organization. Stakeholder theory seeks to define the specific stakeholders of a company and examine the conditions under which manager treat these stakeholders. The theory

identifies the typologies of stakeholders in terms their power that is the extent to which they are able to impose their will in a relationship, their expected structures or behaviors and the criticality of their claims. According to the theory, from the examination of these attributes it is possible to find out the implications of controversial interactions between stakeholders and organizations by introducing similar interests and connections between them. Further, the instrumental approach of the theory uses empirical data to determine the links that exist between the management of stakeholder groups and the achievement of communal goals (most commonly profitability and efficiency goals)

The rationale of using this theory in this study was that it justifies introduction of the element of stakeholder participation in domestic waste management which is largely seen as a preserve of the county governments and municipal councils. Community members and the county government are both stakeholders in domestic waste management and this study sought to understand how a relationship between them affects the efficiency of the domestic waste management process. The stakeholder theory also uses empirical data to determine the links that exist between the management of stakeholder groups and the achievement of communal goals (most commonly profitability and efficiency goals). This aligns with the study in that it seeks to establish how stakeholder involvement in waste management would impact on the effectiveness of the waste management process.

2.5 The Theory of Waste Management

The study was also guided by the theory of waste management which represents a more detailed description of the concepts and elements of waste management including giving a holistic view of the goals of waste management (Pongrácz, 2002). Waste management theory is based on the belief that waste management is to avoid damage to human health and their surroundings.

According to this theory, the accurate description of the term waste and definition of the role of ownership in waste management is important in coming up with an effective waste management process. The theory recognizes that accurate definition of waste and the clarification of the role of ownership in waste management have a role in effective waste management. It may create a conflict with already existing information and instead increase the problem of waste instead of reducing it or it may improve the effectiveness of waste management. The rationale of using this theory in this study was that the theory as well as the study is interested in finding new information on the society's definition of domestic waste and domestic waste management as well as the influence that society members' participation in waste management has on the effectiveness of the process. On the other hand, the theory of waste management aligns with the study in that it recognizes that accurate definition of waste and the clarification of the role of ownership in waste management have a role in effective waste management. This study sought to determine the influence of such accurate definition and clarification of roles in the waste management process.

2.6 Summary of Literature Review and Identification Research Gaps

Studies of a similar nature have been conducted on domestic waste management. Researchers like Mukisa, (2009) explored the challenges and prospects of public participation in domestic waste management in Kira town, Uganda. The study found that the level of public participation was low and that the best way to start dealing with the domestic waste problem was for the Town Council authorities to show the people that they are worth by involving them in the initial planning process.

Similarly, Mwangi, (2011) assessed household management of domestic solid waste in Makina informal settlements of Kibera slums in Nairobi. The study found that Makina residents had

inadequate capacity to handle solid wastes generated from their households and the practice of the 3Rs: Reduction, Reuse and Recycling of the domestic solid waste was barely there. The study identified various opportunities that exist in Makina area for improvement of the current situation including community training on how to reduce, reuse and recycle domestic solid waste. Further, Monyoncho, (2013) in an assessment of solid waste management in Lamu Kenya identified apathy from households as one of the contributors to the problem of domestic waste management in the area. The study explained this apathy as a result of assumption that it has always been responsibility of county council/government to manage waste.

From the literature reviewed, it was emphasized that domestic waste management should be an inclusive process for it to be successful. Researchers acknowledge that the problem of domestic waste though contributed to by factors like limited resources to manage the solid waste, illegal dumping and lack of enforcement of existing laws it is amplified by a lack of or limited participation in the process by the stakeholders.

CHAPTER THREE: RESEARCH METHODOLOGY AND DESIGN

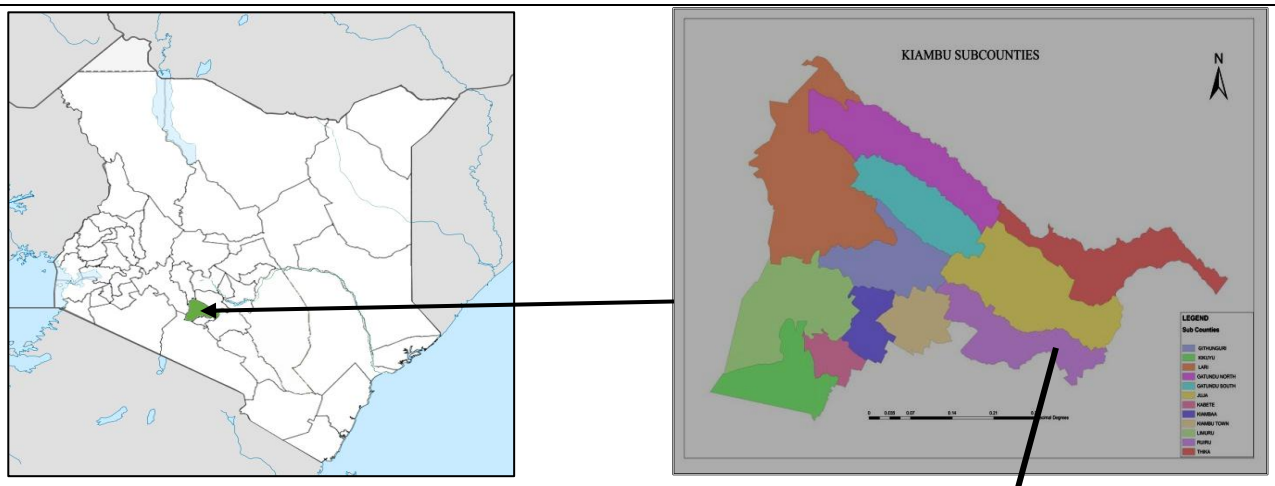
3.0 Introduction

This chapter discusses the methodology that the study followed. It highlights the research design, target population, sample size, sampling technique and procedure, data collection instruments, methods of testifying the validity and reliability of instruments, the research procedure that was followed; and the data management and analysis techniques that were used.

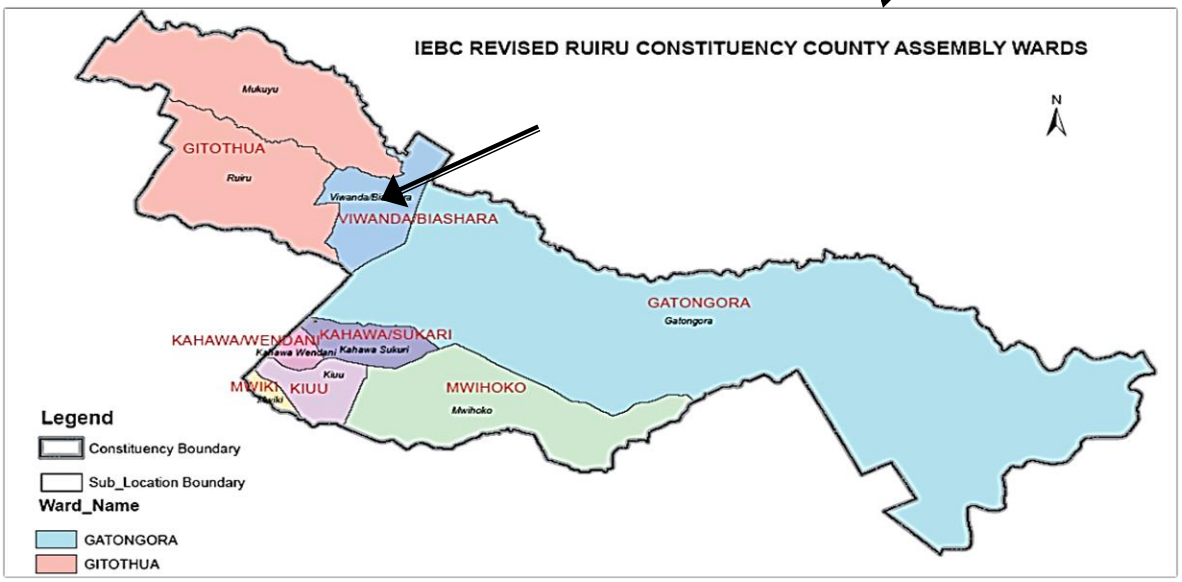
3.1 Research Site

The study was conducted in Biashara residential area of Ruiru sub-county, Ruiru constituency in Kiambu County, Kenya. Ruiru sub- County is located on the 0.5°N Latitude and 37°E Longitude lines. The sub- county of Ruiru is administratively divided into eight (8) wards namely Gitothua, Biashara, Gatong'ora, Kahawa Sukari, Kahawa Wendani, Kiuu, Mwiki and Mwihoko as illustrated in Appendix IV. This study focused on Biashara Ward area which is trough shaped and is generally flat and offers a good location for residence and industrial development. Demographically, Ruiru has a population of 238, 858 while Biashara ward has a population of 41, 596 people according to the 2009 census data KNBS, (2009).

In terms of domestic waste management, household and industrial waste is the responsibility of the Ruiru Environment sub- county office formally referred to as Ruiru municipality. Biashara ward was selected as the study area due to the relevance of the target population to the study. The area is predominantly urban with high literacy levels and stakeholder's participation in waste management processes is largely driven by the level of a population's awareness.



a) Map of Kenya **b) Kiambu County Map**



c) Ruiru Constituency Map Showing Biashara Area

Figure 3.1a: Map of Kenya

Figure 3.1b: Map of Kiambu County

Figure3.1c: Location of the Study Area- Biashara Residential Area, Kiambu County

3.2 Research Design

This study applied a cross- sectional descriptive design, where, both qualitative and quantitative approaches were used to provide a better understanding of the research problem. Descriptive survey is a method of collecting information by interviewing or administering questionnaires to a sample of individuals, (Orodho, 2003). For this study, key informant interviews were used to gather qualitative data from stakeholders on their perceptions and experiences with domestic waste management while questionnaires were used to collect data in the quantitative approach to measure indicators of stakeholder participation.

3.3 Target Population

This study targeted the three categories of stakeholders in Domestic Waste Management. Two (2) sub county environmental officers representing the Government/Authorities in DWM, twenty (20) private waste collectors representing the private sector also referred to as Community Based Organizations in the case of Ruiru, eight hundred (800) business operators and three thousand (3000) household heads representing the community/public as the part of the largest stakeholders in DWM as shown in Table 3.1;

Table 3.1: Target Population of the Study (Stakeholders in DWM in Biashara Area)

Categories	Target Population
Sub-county environmental officer	2
Household heads	3000
Business operators	800
Private waste collectors	20

Source: Ruiru Sub-County Environment Office (2016)

The private waste collector's according to the sub-county environment office included registered and unregistered CBOs and are listed in Table 3.2 below;

Table 3.2: List of Private Waste Collectors

S/No.	Name of group	Status
1.	Ridgeview garbage group	Registered
2.	Shikamana youth group	Registered
3.	Kirere group	Unregistered
4.	Gitambaya youth group	Unregistered
5.	Mihang'o self help group	Unregistered
6.	Miariro youth group	Unregistered
7.	Wataalam green initiative	Unregistered
8.	Market green champions	Unregistered
9.	Township youth green initiative	Unregistered
10.	Makadara self-help group	Unregistered
11.	Green city group	Unregistered
12.	Makindu youth group	Unregistered
13.	Kasarani group	Unregistered
14.	Majengo youth group	Unregistered
15.	BTL youth Agenda	Unregistered
16.	Rolex self-help group	Unregistered
17.	Sweet waters self-help group	Unregistered
18.	Mataa youth group	Unregistered
19.	Matangi young women initiative	Unregistered
20.	Junction youth initiative	Unregistered

3.4 Sampling Techniques and Sample Size

One (1) sub- county environmental officer was purposively selected for this study. The researcher then used simple random sampling technique to select the household heads and business operators to take part in the study so as to give an equal chance for all members of the target population to be a part of the study and to reduce bias in terms of the data collected. Two private waste collectors were also purposively selected for the study. According to Mugenda & Mugenda (2003), a sample of 10% to 30% is satisfactory for a descriptive study therefore for this study, the researcher used 10% of each of the target population. The sample size for household heads therefore was 300, 80 for the business operators and 2 for the private waste collectors. One sub-county environmental officer was also part of the sample as illustrated in Table 3.3.

Table 3.3: Sample Size Grid

Categories	Target Population	Sample Size	Sampling Technique
Sub-county environmental officer	1	1	Purposive sampling
Household heads	3000	300	Simple random sampling
Business operators	800	80	Simple random sampling
Private waste collectors	20	2	Purposive sampling

Source: Researcher (2016)

3.4 Data Collection Tools and Procedures

3.4.1 Questionnaires

The study made use of questionnaires to collect data from household heads and business operators. Questionnaires were used for these two categories because the business operators targeted by the study are the small-scale traders with shops within residential buildings and apartments. According to Eckerdal & Hagström, (2016), a questionnaire produces impactful content that may be used variously in different fields as they are targeted to enlightened groups of the population with a greater scope of understanding of the issues under study. In the questionnaire, the first section (A) sought information on demographic characteristics of the respondents, the second section (B) sought information on how stakeholder participation strategies influence domestic waste management, the third Section (C) and fourth section (D) examined how stakeholder forums' and communication practices influence domestic waste management, while the last section, (E) established how the frequency of stakeholder engagement influences domestic waste management The questionnaires were given through hand delivery and picked using the same method by the researcher.

3.4.2 Interview Guides

The researcher conducted face to face interviews with the sub- county environmental officer and two (2) representatives of the private waste collectors in the area. Key informant interviews were used to get information regarding the role of the municipal council and the private waste collectors in domestic waste management as well as the challenges they face in getting the public to participate in domestic waste management in Biashara residential area.

3.4.3 Pretesting of the Research instruments

A pilot test is necessary for testing the reliability of data collection instruments (Sekaran & Bougie, 2016). Questionnaires and interview schedules were pre-tested prior to the study to ensure that they adequately addressed the issues that the study sought to address. Piloting of research instruments was done in Gitothua ward which is the nearest ward to Biashara in Ruiru constituency and has largely the same demographic characteristics. The researcher used thirty-nine (39) respondents for the pilot which is 10% of the study sample size as recommended by (Connelly, 2008). Piloting assisted the researcher to identify unclear questions and also to correct unclear directions, insufficient space to write the response or wrong phrasing of questions.

3.5 Procedure for Data Collection

The researcher in this study interviewed the sub-county environmental officer and two private waste management company proprietors on face to face basis and used a questionnaire for the household heads and business operators. The questionnaire and the interview schedule used were organized as illustrated in Table 3.4.

Table 3.4: Data Collection Procedures

Research Question	Questionnaire Questions	Interview schedule questions
To what extent do stakeholder participation strategies influence domestic waste management in Biashara residential area?	Section B: Questionnaire for household heads and business operators, question 13	Question 4 and question 5 (i,ii & iii)
How do stakeholder forums and communication practices influence domestic waste management in Biashara residential area?	Section C& D Questionnaire for household heads and business operators, question 14 &15	Questions 6 to question 7(i, ii & iii). Question 8 and question 9 (i, ii & iii)

To what extent does the frequency of stakeholder engagement influence domestic waste management in Biashara residential area?	Section E: Questionnaire for household heads and business operators, question 16	Question 10 and question 11

3.6 Data Analysis Procedure

The data collected was analysed depending on its type. The quantitative data was coded and entered in the computer for analysis using Statistical Package for Social Sciences (SPSS) Version 23 to produce quantitative data to be presented in percentages, frequency tables, Pearson correlation and inferences to show the relationship between the dependent and the independent variables. Qualitative data obtained from the key informant interviews was transcribed and processed in themes and presented and discussed in light of the conceptual framework. The qualitative data was used to underpin the quantitative findings, and was presented using tables and charts. The data analysis procedure is illustrated in Table 3.5;

Table 3.5: Data Analysis Procedures

Research Questions	**Independent Variable**	**Dependent Variable**	**Quantitative Data Analysis**	**Qualitative Data Analysis**
To what extent do stakeholder participation strategies influence domestic waste management in Biashara residential area?	Stakeholder participation strategies	Domestic waste management	- Frequencies -Percentages -Pearson correlation	-Thematic Analysis
How do stakeholder forums and communication practices influence domestic waste management in Biashara residential area?	Stakeholder forums and communication practices	Domestic waste management	-Frequencies -Percentages -Pearson correlation	-Thematic Analysis
To what extent does the frequency of stakeholder engagement influence domestic waste management in Biashara residential area?	Stakeholder engagement frequency	Domestic waste management	-Frequencies -Percentages -Pearson correlation	-Thematic Analysis

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.0 Introduction

This chapter presents and discusses the findings of the study and provides a detailed outlook of those findings in relation to previous similar studies.

4.1 Response Rate

There were 300 household heads and 80 business owners in Biashara ward who participated by filling a questionnaire. Of the 380 questionnaires handed out the researcher received back 342 representing a 90% response rate among households and businesses owners. Further, 2 waste private collectors and 1 sub-county environment officer were also interviewed for the study.

4.2 Influence of stakeholder participation strategies on domestic waste management in Biashara residential area.

Stakeholder participation strategies for the purpose of this study refer to the plans through which stakeholders are brought on board to take play a role in how the waste we create is collected, transported, and disposed. For waste separation at the household and business operators' level, the researcher established that only 30.7% of the respondents separate their waste at household level while the remaining 69.3% did not as shown in Table 4.1.

Table 4.1: Rate of Separate Waste in Households and Business Premises

Households & Business Premises	**Frequency**	**Percentage (%)**
Separation	105	30.7%
Do not Separate	237	69.3%
TOTAL	**342**	**100%**

The respondents were also found to have been empowered to recycle their waste as indicated in Figure 4.1, where Fifty-nine (59%) of the respondents strongly agreed that they are empowered to recycle their waste while 39% of the respondents agreed. Only 2% of the respondents disagreed that they were empowered to recycle their waste.

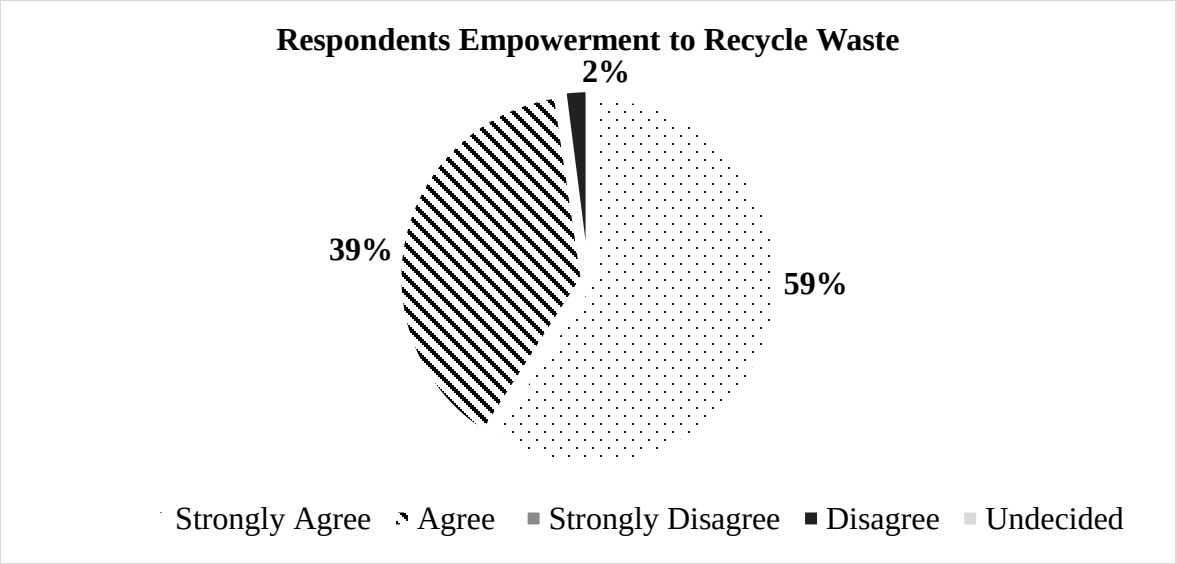


Figure 4.1: Respondents Empowerment to Recycle Waste

These finding are in line with the researcher's findings that the respondents across the education levels as illustrated in Table 4.2 carry out separation of waste which enables them to be able to recycle what is recyclable. The results show that 44.4% and 34.5% respectively of respondents agree and strongly agree that separation of domestic waste is carried out at the household level indicating that there is a significant positive correlation between level of education and separation of waste ($r=0.180$, $n= 342$, $p=0.01$). These findings agree with those of Kitavi, (2015) who in his study on the role of public participation in solid waste management in Mlolongo town found that 76% of respondents could separate their solid waste while only 24% could not separate waste. As was the finding of this study, Kitavi, (2015) also indicated that this separation was essential in promoting effective DWM as it encouraged re-use and recycling of waste.

Table 4.2: Respondents waste separation per education level

Level of Education	Waste separation is carried out					Total
	Undecided	Disagree	Strongly Disagree	Agree	Strongly Agree	
Postgraduate	0	0	0	1	0	1
Bachelor's Degree	2	3	0	19	10	34
Diploma	3	3	1	16	24	47
Certificate	3	8	0	34	26	71
Secondary School	6	21	17	40	51	135
Primary School	3	2	0	42	7	54
Total/ Percentage (%)	**17 (5%)**	**37 (10.8%)**	**18 (5.3%)**	**152 (44.4%)**	**118 (34.5%)**	**342 (100%)**

On waste storage, the study found that, a majority of the respondents had a waste container with 92.1% of the respondents saying that they had waste containers and only 7.9% saying that they did not. As illustrated in Figure 4.3, 54% of the respondents use plastic bins as their waste containers while 36% of the households use plastic bags for waste storage. The other 6% the respondents use metal bins and 4% use sacks to store their waste.

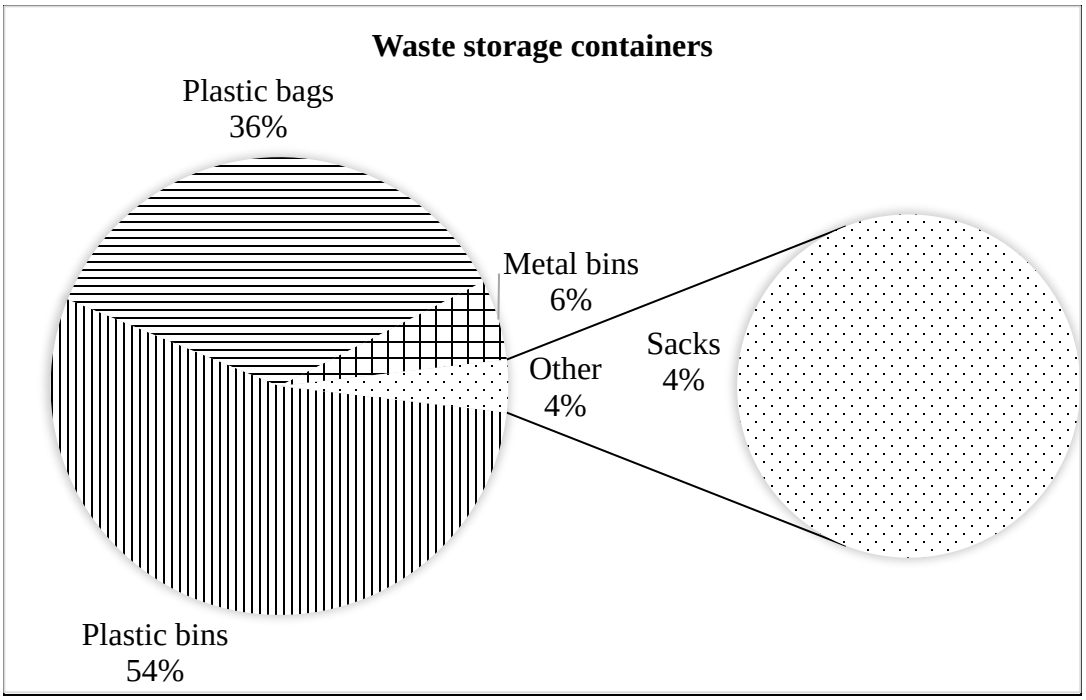


Figure 4.3 : Waste Storage containers used by respondents

According to the results in Table 4.3, the respondents were asked whether they employed the above identified storage techniques through stakeholder consultations. The results illustrated that 19.3% of the respondents strongly agreed that it was through consultations that they had been able to use the said storage techniques, 42.7% agreed, 9.1% strongly disagreed while 17.8% disagreed. The results indicated that there is a significant positive correlation between stakeholder consultations on waste storage techniques and improved DWM ($r=0.328$, $n=342$, $p=0.01$), as stakeholders' consultations are held respondents increasingly use suggested waste storage.

Table 4.3: Consultations and Use of Waste storage Techniques

Consultations	Frequency/Percent	Pearson Coefficient (r)	P value
Strongly Agree	66(19.3)	0.328	0.01
Agree	146(42.7)		
Undecided	38(11.1)		
Disagree	61(17.8)		
Strongly Disagree	31(9.1)		
Total	**342 (100)**		

Further the study established that through consultations, of the 92.1% of the households where there are waste storage containers, 41.9% of the respondents have bought the waste containers for themselves while 24.9% had waste containers provided by their landlords. Additionally, 20% of the respondents had their waste containers provided by their private waste collectors and 11.1% were supplied waste containers by the county council as illustrated in Table 4.4.

Table 4.4: Source of Waste Storage Containers

Source of Waste Container	Frequency	Percentage (%)
Buying for self	132	41.9
Landlord	85	27
private waste collectors	63	20
county council	35	11.1
TOTAL	**315**	**100**

With regards to waste collection, the researcher first sought to establish who is in charge of waste collection in Biashara residential area. The respondents were asked who collected their waste and 43.9% of the respondents said that their waste is collected by the county council vans while 42.6% of the respondents cited private companies as the collectors. However, as illustrated in Figure 4.4, 5% of the respondents did not know who collected their waste once they put it outside their apartments while a further 8.5% of the respondents did not answer that question.

According to the Sub- county Environment Officer, the county council licenses private companies to assist it in waste collection since so much waste is generated in the Sub- County that it exceeds their capacity. This explains the 42.6% of the respondents who said that their waste is collected by private companies.

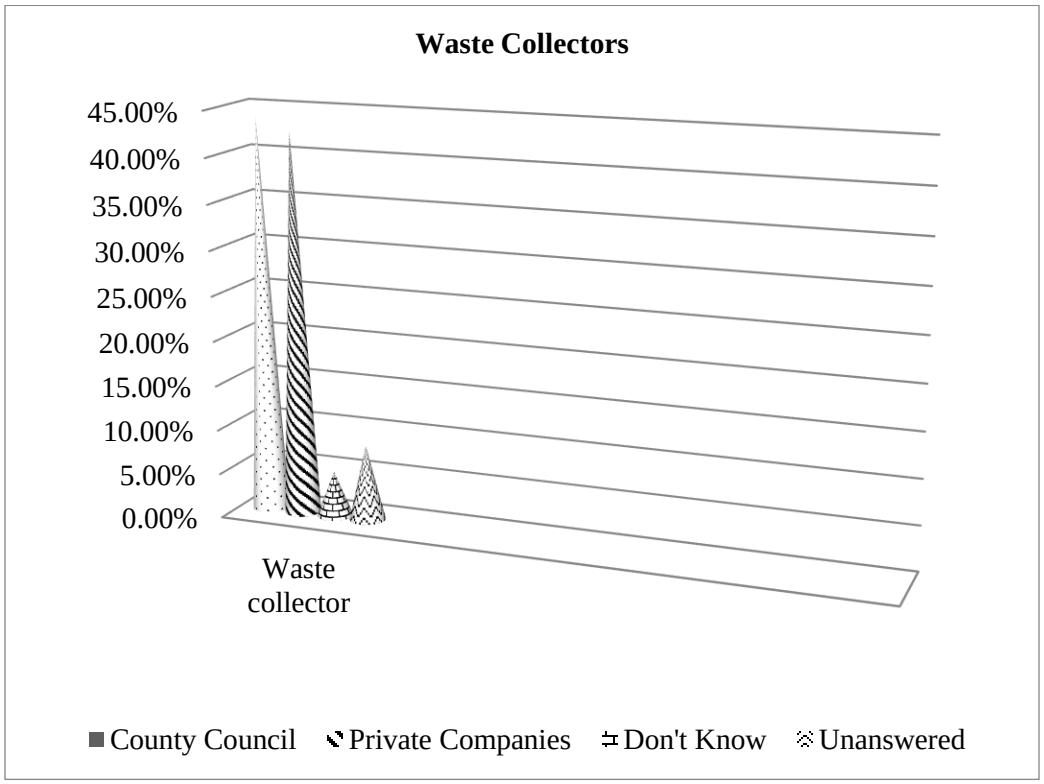


Figure 4.4: Waste Collectors in Biashara area according to respondents

Further, the researcher tried to establish the frequency with which waste collection is carried out in Biashara residential area. The results indicated that 60% of the residents empty their waste weekly while 30.7% of the respondents empty their waste twice per week. Waste is said to be collected either at a central place within apartments, outside apartments and by collection trucks directly from the houses on certain set days. As illustrated in Table 4.5, some of the households also dump in open spaces outside their apartments especially those without waste storage containers. The arrangement is to have this waste collected later by private companies or the county council for final disposal.

Table 4.5: Waste Collection Site and Frequency

Collection site	**Frequency of Waste Collection**					**Total**
	Weekly	**Twice/week**	**Monthly**	**Fortnightly**	**Daily**	
Within Apartment	35	15	15	0	0	65
Outside Apartment	89	48	0	6	13	156
Open space	22	26	0	0	24	72
Waste collection trucks	21	28	0	0	0	49
Total	**167**	**117**	**15**	**6**	**37**	**342**
Percentage (%)	**53.9%**	**30.8%**	**4%**	**1.6%**	**9.7%**	**100%**

In line with these results, the researcher sought to find out whether stakeholders have partnerships to designate waste collection sites and the responses for these questions are summarized in Table 4.6 below. As to whether waste collection points were designated through stakeholder partnership, the results showed that 28.7% of the respondents were undecided, 26% agreed, and 25.1% disagreed, 14.3% strongly agreed while 5.9% strongly disagreed. The researcher determined that there is a moderate positive correlation between use of stakeholder partnerships in designating waste collection points and improved DWM ($r=0.360$, $n=342$, $p=0.01$), waste collection improves as stakeholder partnerships to designate waste collection sites are carried out.

Table 4.6: Respondents views on stakeholder partnerships in designation of waste collection cites

Designated waste collection cites provided through stakeholder partnership	Frequency (%)	Pearson coefficient (r)	P value
Strongly Agree	49(14.3)	0.360	0.01
Agree	89(26)		
Undecided	98(28.7)		
Disagree	86(25.1)		
Strongly Disagree	20(5.9)		
Total	**342(100)**		

Regarding waste collection, the study sought to establish whether there are stakeholder dialogues to designate waste collection days, the results showed that 37.7% of the respondents disagreed, 30.1% strongly disagreed, 22% agreed, 14.3% strongly agreed and 0.3% were undecided. These set of results reveal a pattern where cumulatively 59.7% of the respondents felt that there was no partnership between stakeholders in designating waste collection sites and 68.1% of the respondents felt that there was no dialogue to designate waste collected days. These results indicated that there is an inadequacy of both partnerships and dialogues in the waste collection dimension of waste management which negatively affects domestic waste management in Biashara ward.

The researcher also sought to find out whether the designated waste collection days were adhered to and whether the waste collection services offered were therefore satisfactory. The results obtained indicated that cumulatively, 67.5% of the respondents felt that the designated waste collection days were not adhered to while 32.5% of the respondents said that the designated waste collection days were adhered to. As to whether the waste collection services were satisfactory, the results indicated a low level of satisfaction with 46.5% of the respondents strongly disagreeing that the waste collection services were satisfactory, 33.9% disagreeing and

19.6% of the respondents agreeing that the services are satisfactory. Cumulatively, 80.4% of the respondents felt that the waste collection services were unsatisfactory; these findings are captured in Table 4.7. The findings reveal that there is a significant positive correlation between using stakeholder dialogues to designate waste collection days and the level of satisfaction with the waste collection services provided (r=0.564, n=342, p=0.01).

Table 4.7: Adherence to designated waste collection days and level of satisfaction with waste collection services according to respondents

	Frequency (%)	**Cumulative Percent**	**Pearson Coefficient(r)**	**P Value**
	Adherence			
Undecided	8(2.3)	2.3	0.564	0.01
Disagree	117(34.2)	36.5		
Strongly Disagree	106(31)	67.5		
Agree	111(32.5)	100		
Total	**342(100)**			
	Satisfaction Level			
Disagree	116	33.9		
Strongly Disagree	159	46.5		
Agree	67	19.6		
Total	**342**	**100**		

These results are in line with those by Yoada, *et al*., (2014) from their study on Domestic waste disposal practice and perceptions of private sector waste management in urban Accra where they found a low community satisfaction with waste management services with only 37.1% of respondents being satisfied with the provided services. Interestingly, in Accra, even among those who paid for the services, the level of satisfaction was low with 62.9% of the respondents saying that they found the service unsatisfactory because of the cost and irregular collection. In Biashara ward, the low level of satisfaction with waste collection services is linked to the lack of adherence to the designated waste collection days thus irregularity in the process.

The researcher sought to establish; first, whether stakeholder partnerships improve waste collection and transportation, second, whether stakeholder consultations have increased efficiency in domestic waste management, third, whether stakeholder empowerment has increased efficiency in domestic waste management and fourth, whether these stakeholder dialogues have improved domestic waste management. The responses for the first two questions are captured in Table 4.8 and indicated that on whether stakeholder partnerships improved waste collection and transportation, 50.9% agreed, 30.4% disagreed, 8.8% strongly disagreed, 8.5% strongly agreed and 1.5% of the respondents were undecided. Also, there is a weak positive correlation between stakeholder partnerships in waste collection and transport and improved DWM (r=0.039, n=342, p=0.470). On whether stakeholder consultations increased efficiency of DWM, the results were that 49.7% agreed, 22.5% disagreed, 20.5% strongly agreed, 5.3% strongly disagreed and 2% of the respondents were undecided. The study revealed that there is a medium positive correlation between stakeholder consultations and improved DWM (r=0.328, n=342, p=0.01).

Table 4.8: Influence of stakeholder partnerships and consultations on Domestic Waste Management

Stakeholder Partnership	**Frequency (%)**	**Pearson Coefficient (r)**	**P Value**
Undecided	5(1.5)	0.039	0.470
Disagree	104(30.4)		
Strongly Disagree	30(8.8)		
Agree	174(50.9)		
Strongly Agree	29(8.5)		
Total	**342**		
Stakeholder Consultations			
Undecided	7(2.0)	0.328	0.01
Disagree	77(22.5)		
Strongly Disagree	18(5.3)		
Agree	170(49.7)		
Strongly Agree	70(20.5)		
Total	**342(100)**		

As illustrated in Table 4.9, the researcher also found that stakeholder empowerment in recycling of domestic had increased efficiency in domestic waste management, where 43.3% of the respondents strongly agreed, 30.7% agreed, 17.5% disagreed, 5.6% were undecided and 2.9% of respondents strongly disagreed. There is a strong positive correlation between stakeholder's empowerment to recycle their waste and improved DWM (r=0.539, n=342, p=0.01), as stakeholder empowerment to recycle increases so does improvement in DWM. These findings are in line with the findings by Minn, Srisontisu and Laohasiriw, (2010) who found that stakeholder participation through empowerment with knowledge and skills relevant to domestic waste management had the effect of motivating people to carry out good waste management practices like recycling. Empowerment was also cited as a gratifying achievement that gave people more power to participate decisively in domestic waste management hence reducing reliance on the municipal council for waste management.

Table 4.9: Influence of stakeholder empowerment and dialogues on Domestic Waste Management

Stakeholder Empowerment	**Frequency (%)**	**Pearson Coefficient (r)**	**P Value**
Undecided	19(5.6)	0.539	0.01
Disagree	60(17.5)		
Strongly Disagree	10(2.9)		
Agree	105(30.7)		
Strongly Agree	148(43.3)		
Total	**342(100)**		**100**

However, the researcher also found that of the above-mentioned stakeholder participation strategies the respondents felt that there were inadequate dialogues and consultations among domestic waste management stakeholder in Biashara residential area and inferred that this could be one of the causes of the challenges in domestic waste management in the ward. As indicated

in Table 4.10, 56.7% of the respondents disagreed that stakeholder dialogues were adequate and 16.7% strongly disagreed with that sentiment and only 26.6% of the respondents felt that dialogues were adequate. On the other hand, 55.8% of the respondents disagreed with the statement that there is adequate stakeholder consultation, 18.7% strongly disagreed, 16.7% were undecided and only 8.8% felt that stakeholder consultations were adequate. These findings agree with those of Biyani and Anantharaman, (2017) who recommended inclusive dialogues among all social groups including slum residents in the city of Bangalore, India to improve waste management. Their research on Aligning Stakeholder Frames for Transition Management in Solid Waste had found low levels of awareness on domestic waste management among the larger population with such awareness only restricted to the elite and middle-class citizens becoming a barrier to proper waste management.

Table 4.10: Adequacy of Stakeholder Dialogues and Consultations

Stakeholder Dialogues Adequate	**Frequency**	**Percent**
Disagree	194	56.7
Strongly Disagree	57	16.7
Agree	91	26.6
Total	**342**	**100**
Stakeholder Consultations Adequate		
Undecided	57	16.7
Disagree	191	55.8
Strongly Disagree	64	18.7
Agree	30	8.8
Total	**342**	**100**

4.3 Influence of stakeholder forums and communication practices on domestic waste management in Biashara residential area

Stakeholder forums and communication practices apply to all the processes of waste management. With regards to the influence of stakeholder forums and communication practices on domestic waste management, the researcher first sought to establish the existence of such stakeholder forums in the ward. The respondents were asked closed ended questions to determine whether there are people surveys, partner meetings, tenant meetings, citizen panels and citizen workshops to address DWM issues in Biashara ward.

On whether the county council carries out domestic waste management people surveys the results are captured in Figure 4.5 and they indicate that, 48.2% of the respondents strongly disagreed that such surveys are carried out, 16.4% disagreed with the sentiment, 15.8% were undecided while only 18.4% of the respondents agreed that such surveys are conducted. These results were backed up by the sub-county environmental officer who admitted in his interview that domestic waste management surveys commissioned by the county government are a rarity due to budgetary constraints saying… "*The county government domestic waste budget is so constrained that most of it is directed to the actual work of waste collection and transport so that there are no resources left for such studies*…". Further the environmental officer admitted that studies such as this one is where they are able to occasionally get feedback from the residents on their views on domestic waste management and the quality of the domestic waste management services provided by the county council and their partners.

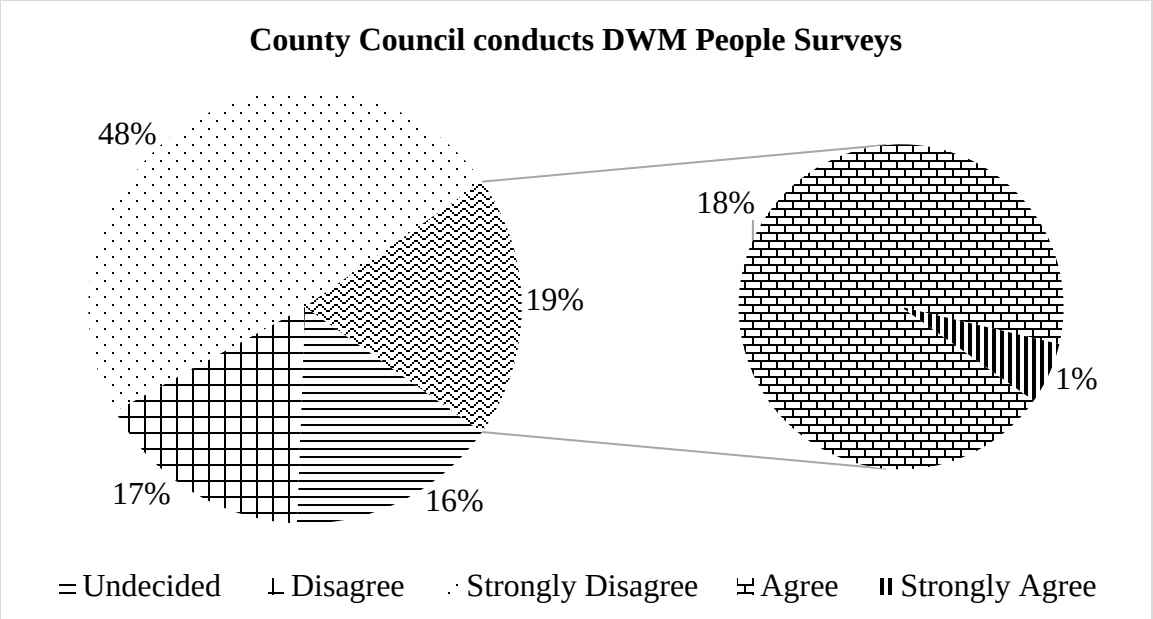


Figure 4.5: Respondents views on whether the county council conducts DWM People Surveys

On the limited number of DWM people surveys that respondents have previously been engaged in, the researcher tried to establish their scope and found out that previous studies tended took the respondents views on whose responsibility it is to manage domestic waste, the role of citizens in domestic waste management and the citizen's awareness of the effects of poor domestic waste management. The study found out that 29.2% of the respondents had taken part in DWM surveys on the roles of the county council and the citizens in DWM, 14.6% had taken part in surveys on the effects of poor DWM and the remaining 56.2% had not taken part in any previous surveys on DWM as illustrated in Figure 4.6.

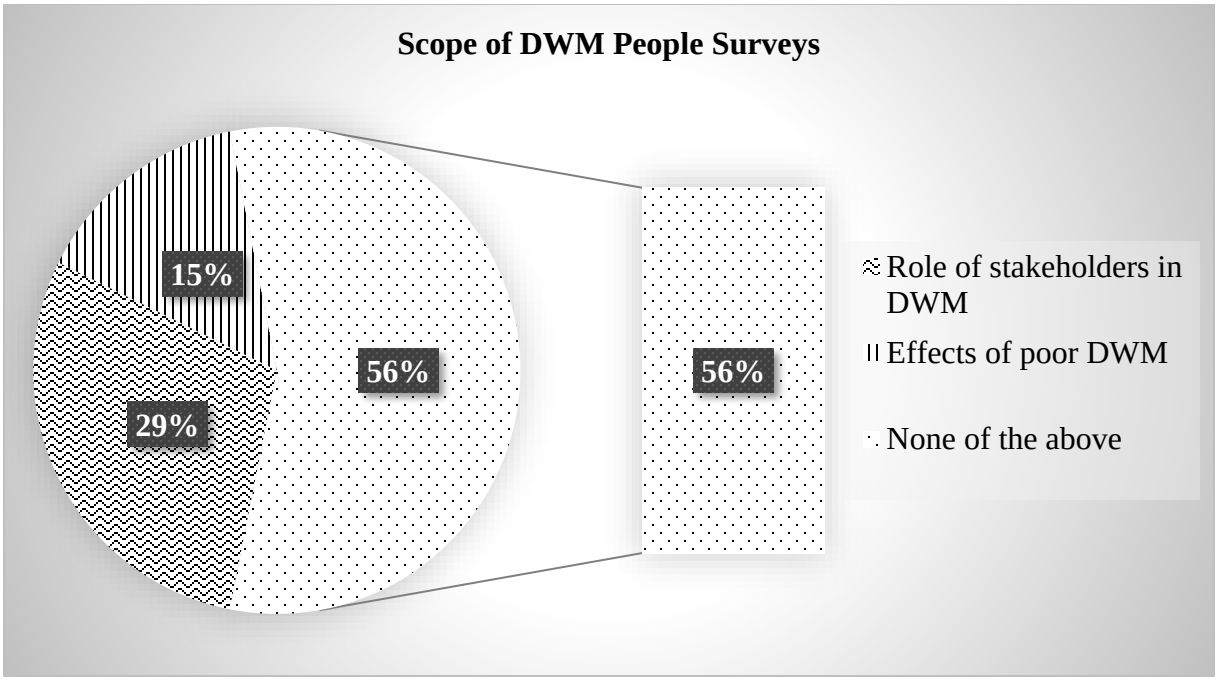


Figure 4.6: Respondent's views on the scope of previous DWM People surveys

The researcher therefore tried to find out whether the DWM people surveys carried out are adequate and whether the said surveys improve the DWM situation in Biashara Ward. The results are indicated in Table 4.11 and they show that with regards to the adequacy of DWM people surveys, only 8.8% of the respondents agree that the surveys carried out are adequate with 41.8% of the respondents strongly disagreeing with that assertion. A further 22.5% of the respondents disagree and 26.9% of the respondents are undecided. Regarding whether the people surveys carried out improve DWM, the results showed that 38.6% of the respondents agreed that when carried out the surveys have an effect of improving DWM. Further, 15.5% of the respondents strongly agree with that assertion, 17% disagree, 14.6% strongly disagree and 14.3% are undecided. The study also determined that there is a strong positive correlation between the adequacy of people surveys carried out and improved DWM and that this correlation is statistically significant ($r=0.580$, $n=342$, $p=0.01$).

Table 4.11: Respondents views on the Adequacy of people surveys and whether the improve DWM

People Surveys Adequate	Frequency (%)	Pearson's coefficient (r)	P Value
Undecided	92(26.9)	0.580	0.01
Disagree	77(22.5)		
Strongly Disagree	143(41.8)		
Agree	30(8.8)		
Total	**342**		
People Surveys improve DWM			
Undecided	49(14.3)		
Disagree	58(17)		
Strongly Disagree	50(14.6)		
Agree	132(38.6)		
Strongly Agree	53(15.5)		
Total	**342(100)**		

On the dimension of waste transport and disposal, the study established that the waste is transported by the county council or private waste collectors' trucks, handcarts or wheelbarrows. As shown in Figure 4.7, 43.9% of the respondents said that their waste is collected by the county council vans while 32.7% of the respondents cited private companies as the collectors, 16.1% cited handcarts and 7.3% said that their waste was collected by wheelbarrows. According to the sub-county environment officer, Ruiru Sub- County currently has three (3) waste collection trucks owned by the county government and has licensed some private waste collection trucks to assist in waste collection, transport and transfer. Other youth groups in the sub-county are said to have also organized themselves and undertake garbage collection using handcarts and wheelbarrows as their income generating activity and are accordingly licensed by the sub-county environment office.

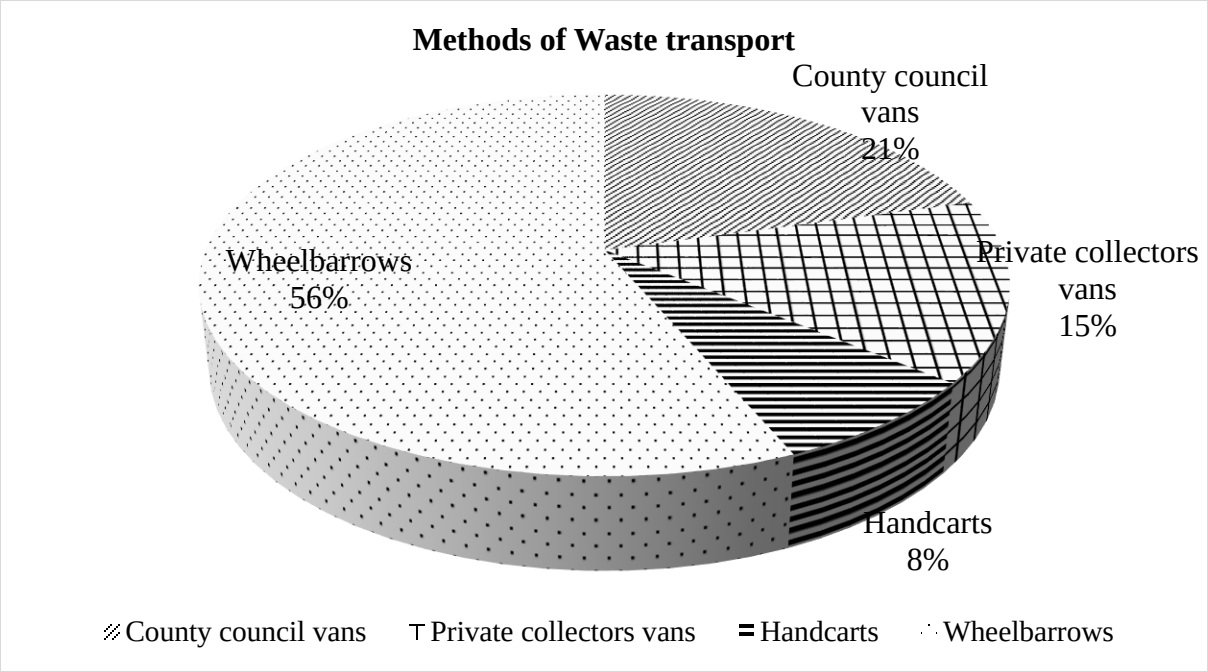


Figure 4.7: Respondents' views on the methods of waste transport in Biashara residential area

The researcher further sought to establish whether there are meetings between stakeholders regarding the transport aspect of DWM in Biashara residential area and their adequacy if they are there. The responses are captured in Table 4.12 below and show that there exist partner meetings as well as tenant meetings regarding domestic waste transport. As captured in the table, 38.6% and 42.7% of the respondents respectively agree that partner and tenant meetings are held in Biashara ward. However, the respondents felt that these stakeholder meetings are not adequate with 56.7% disagreeing that partner meetings are adequate and 33.6% disagreeing that tenant meetings held are adequate. These responses were backed up by comments from one private waste collectors who said "…*we have meetings with our clients and the county council officials sometimes but these meetings are not nearly enough to address the issues that keep coming up with regards to our work and the services we offer particularly on waste transport*…".

Table 4.12: Respondents views on presence of stakeholder meetings and their adequacy

	Partner meetings are held	Partner meetings adequate	Tenant meetings are held	Tenant meetings adequate
Undecided	1.5%	7.6%	0.3%	2.1%
Strongly Disagree	12.3%	15.2%	15.5%	22.5%
Disagree	33%	56.7%	4.4%	33.6%
Strongly Agree	14.6%	9.4%	37.1%	6.7%
Agree	38.6%	11.1%	42.7%	35.1%
Total	**100**	**100**	**100**	**100**

The study also sought to establish the influence of the stakeholder meetings on domestic waste transport for which the researcher asked the question, whether adequate partner and tenant meetings held improve domestic waste transport. The results as shown in Table 4.13 indicated that 58.5% of the respondents strongly agreed that adequate partner meetings improve domestic waste transport while 50.3% of the respondents agreed that adequate tenant meetings improve the same. Both the private waste collectors interviewed agreed with these findings saying that every time they have had stakeholder meetings the effect has been smooth operations for them and reduced complaints from their clients. On the correlation between stakeholder meetings and domestic waste management, the study revealed that there is a significant strong positive correlation between adequacy of partner meetings and improved DWM ($r=0.491$, $n=342$, $p= 0.01$). Likewise, the study deduced that there is significant moderate positive correlation between the adequacy of tenant meetings and the improvement of DWM ($r=0.317$, $n=342$, $p=0.01$), as more stakeholder meetings are held on the domestic waste transport, DWM improves.

Table 4.13: Respondents views on the influence of the adequacy of stakeholder meetings on DWM

	Partner Meetings Improve waste transport	Pearson's Coefficient (r)	Tenant Meetings Improve waste transport	Pearson's Coefficient (r)
Undecided	9.4%	0.491	8.5%	0.317
Strongly Disagree	7%	P Value=0.01	9.9%	P Value=0.01
Disagree	9%		6.2%	
Strongly Agree	58.5%		25.1%	
Agree	16.1%		50.3%	
Total	**100**		**100**	

On the dimension of final waste disposal, the study sought to find out whether citizens are involved in final waste disposal. As illustrated in Figure 4.8, 81.6% of the respondents had no idea how waste collected in their area is finally disposed of while 16% of the respondents speculated that the waste was taken to a dumpsite but did not claim to know of the existence of such a dumpsite in the county. Another 2% of the respondents cited burning as means of disposal but did not know whether the county had incinerators for that purpose. According Ruiru Environment Sub- county office, Kiambu County as a whole has three dumpsites located in Limuru, Kiambu and Thika. The waste collected from Ruiru Sub-county where Biashara Ward is one of the residential areas is either taken to the Kiambu or Thika dumpsites.

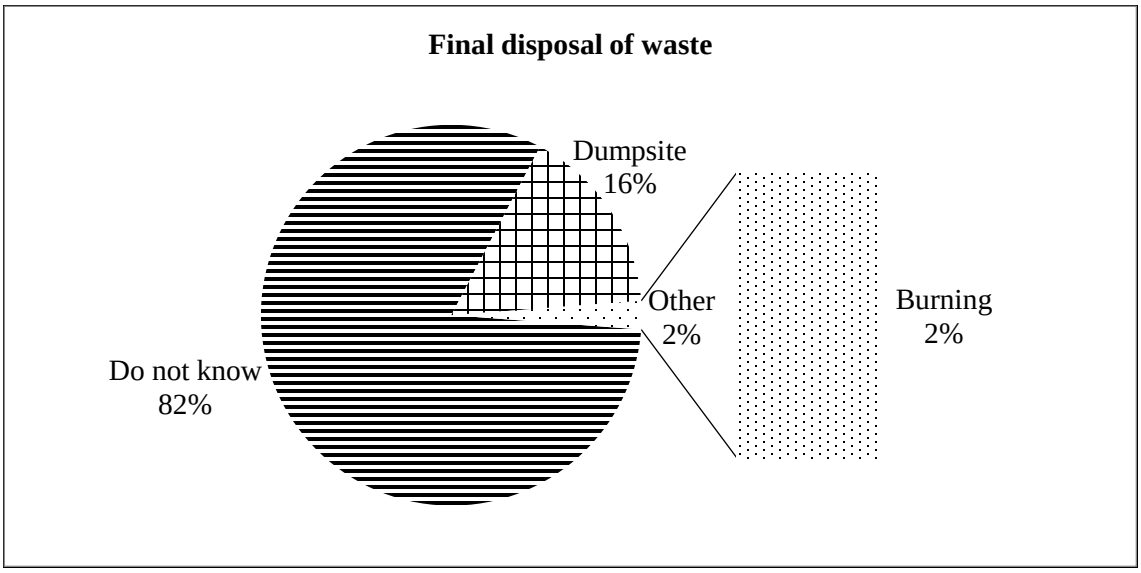


Figure 4.8: Respondents' views on the final waste disposal methods used in Biashara residential area

The study then sought to establish whether citizens are involved in decisions regarding the final disposal methods of waste from their premises by asking the respondents whether citizen panels or citizen workshops are held, whether those panels and workshops are adequate and whether both the citizen panels and workshops improve DWM in Biashara ward. On whether citizen panels and workshops are held, the responses for this question are illustrated in Figure 4.9 and indicated that majority of the respondents disagreed with the assertion that citizen panels and workshops are held at Biashara ward with 50.9% of them disagreeing that citizen panels are held and 46.8% disagreeing that citizen workshops are held. Additionally, the private waste collectors and the sub-county environment officer said that DWM manage workshops are rarely held and when they are, they are not targeted towards the residents but rather to financial partners in the field of waste management.

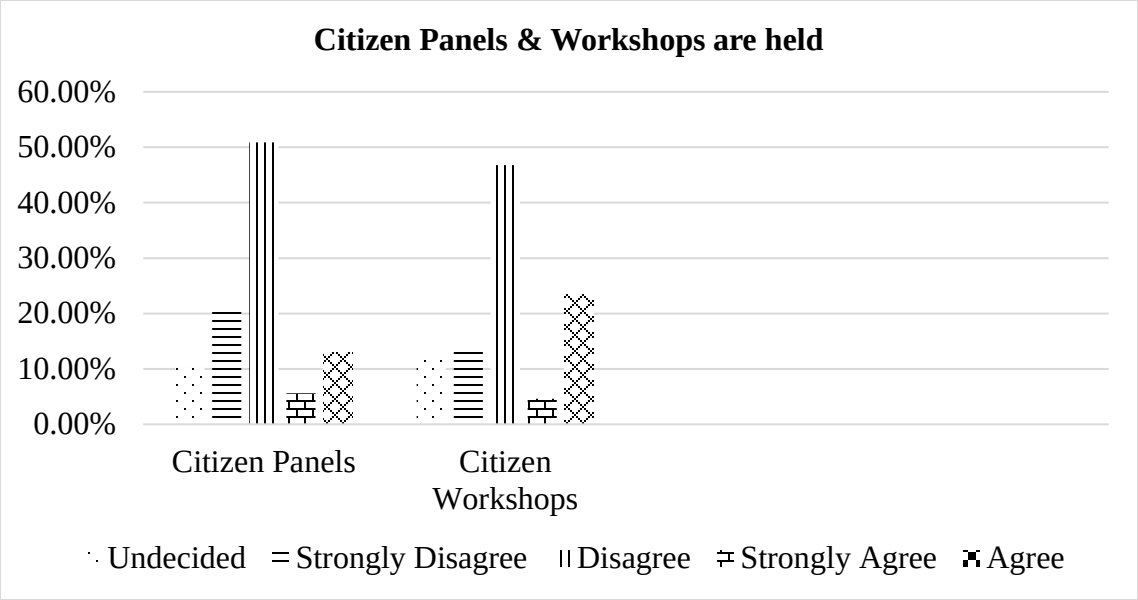


Figure 4.9: Respondents' views on whether Citizen Panels & Citizen Workshops are held in Biashara Ward

On whether the citizen panels and workshops held are adequate and their influence on DWM, the results were that 57.6% of the respondents disagreed that citizen panels were adequate and 40.3% of the respondents strongly disagreed that the citizen workshops held were adequate as indicated in Table 4.14. Further, the results also indicated that respondents were in divided as to whether citizen panels and workshops when held improve DWM with 38.5% of them agreeing that citizen panels improve DWM and 48.5% of the respondents agreeing that citizen workshops improve DWM in Biashara ward while in the same breadth 32.2% and 30.8% of the respondents respectively being undecided on whether workshops and panels improve DWM in Biashara residential area. On the correlation between citizen panels and improved DWM, the study inferred that there is a weak but significant positive correlation between organization of citizen panels to and improved DWM ($r=0.170$, $n=342$, $p=0.01$). Similarly, there is a moderate positive correlation between organizing citizen workshops for DWM and improved DWM ($r=0.370$,

n=342, p=0.01, as citizen panels and workshops are held there is a slight but significant improvement in DWM.

Table 4.14: Respondents views on the adequacy and influence of citizen panels and workshop on DWM in Biashara Ward

	Citizen Panels are adequate	Citizen Panels improve DWM	Pearson's Coefficient (r)	Citizen Workshops are adequate	Citizen Workshops improve DWM	Pearson's Coefficient (r)
Undecided	5.8%	32.2%	0.170	13.7%	30.8%	0.370
Strongly	26.6%	7%	P	40.3%	6.1%	P
Disagree	57.6%	10.9%	Value=0.01	38.9%	11.4%	Value=0.01
Disagree	6.2%	11.4%		5.6%	3.2%	
Strongly Agree	3.8%	38.5%		1.5%	48.5%	
Agree						
Total	**100**	**100**		**100**	**100**	

This study also intended to find out how stakeholder's communication practices influence domestic waste management Biashara area. The researcher therefore asked the respondents close-ended questions to determine the methods of communication used between stakeholder and their effects on various aspects of the DWM process. The researcher asked close ended questions to determine the various communication strategies and their influence on DWM.

First the researcher sought to find out whether there are consultations between stakeholders on the appropriate DWM practices. The results showed that majority of the respondents (67.8%) felt that such consultations are there sometimes while 25.7% of the respondents felt that such consultations were rarely there and 5.6% of the respondents felt that consultations are never carried out as illustrated in Figure 4.10.

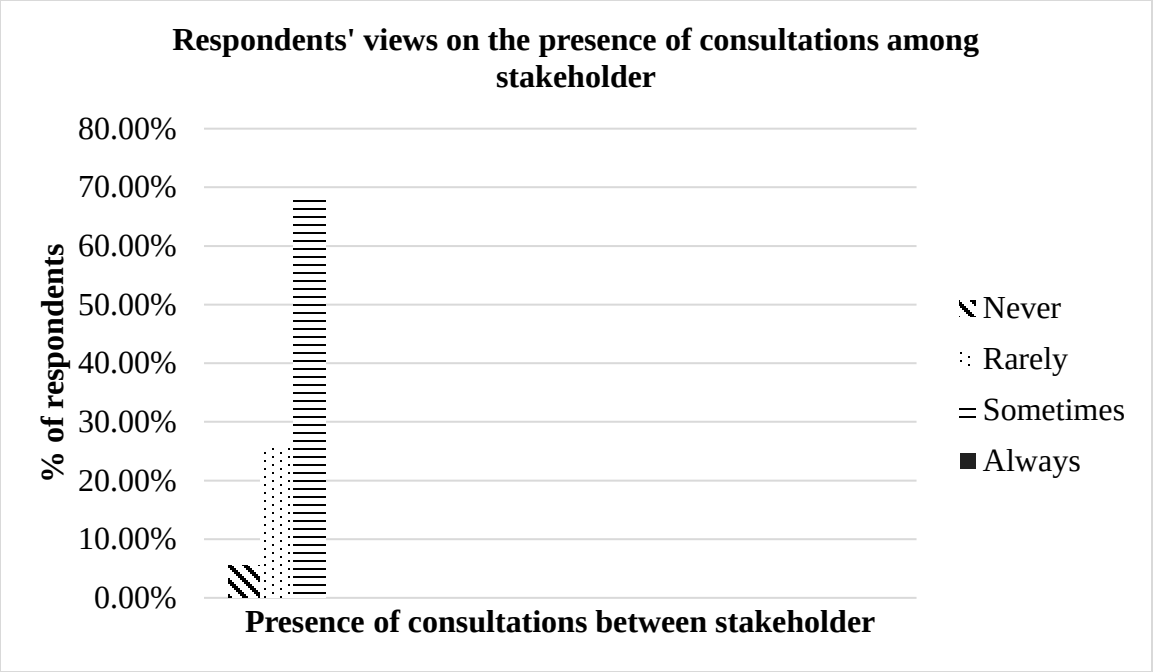


Figure 4.10: Respondents' views on the presence of consultations among stakeholders

On the stakeholder consultations, the researcher also sought to find out whether the consultations that were found to be existing improved the DWM practices in Biashara ward. The question whether regular consultations between stakeholders improves DWM was asked to the respondents and the study established that there is a significant moderate positive correlation between consultations on appropriate DWM practices and improved DWM (r=0.346, n=342, r=0.01). The results further indicated that 40.6% of the respondents said that consultations sometimes improve DWM, 40.1% said that consultations always improve DWM, 17.3% said that consultations improve DWM rarely, 1.5% said consultations never improve DWM and 0.6% of the respondents had no comment as captured in Figure 4.11. Majority of the respondents felt consultations improve DWM sometimes because they felt that consultations are only done as an afterthought when decisions regarding aspects of DWM have already been made. This is in line with the findings of Garnett, *et al*., (2017) in whose study on negotiating public involvement in

municipal waste management decision-making in the UK, respondents stated that they tended to view formal consultations as a formality for already pre-determined decisions when it comes to DWM. This assertion was supported by the sub-county environment officer and both the private waste collectors interviewed for the study whose experience was that sometimes, their DWM proposals worked better when they consulted one another and the residents who are the recipients of their services. However, they noted that this is not always the case due to lack of cooperation from the residents.

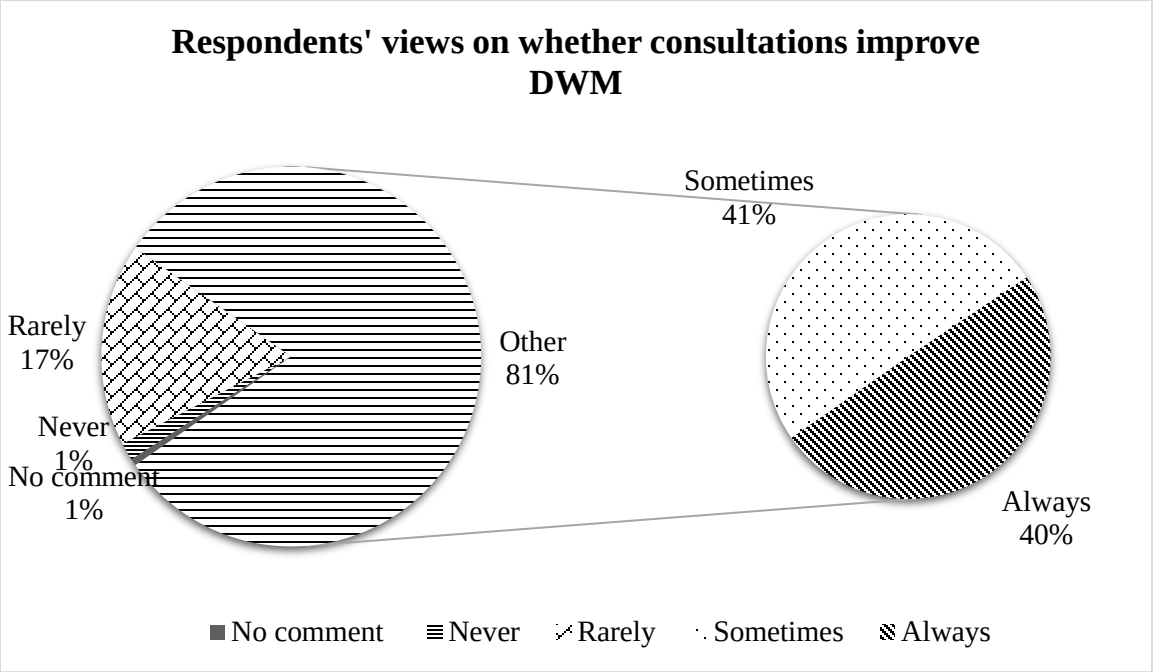


Figure 4.11: Respondents' views on whether consultations improve DWM

Aside from consultations, the study further sought to establish whether there are negotiations between stakeholders to designate waste collection days, whether the negotiated waste collection days are adhered to and how such adherence or lack of it affects DWM in Biashara ward. The researcher found that the majority of the respondents (44.2%) felt that there are rarely any negotiations on waste collection days while 27.5% of the respondents felt that such negotiations

are only there sometimes and 13.6% of the respondents felt that there are never negotiations to designate waste collection days as captured in Figure 4.12.

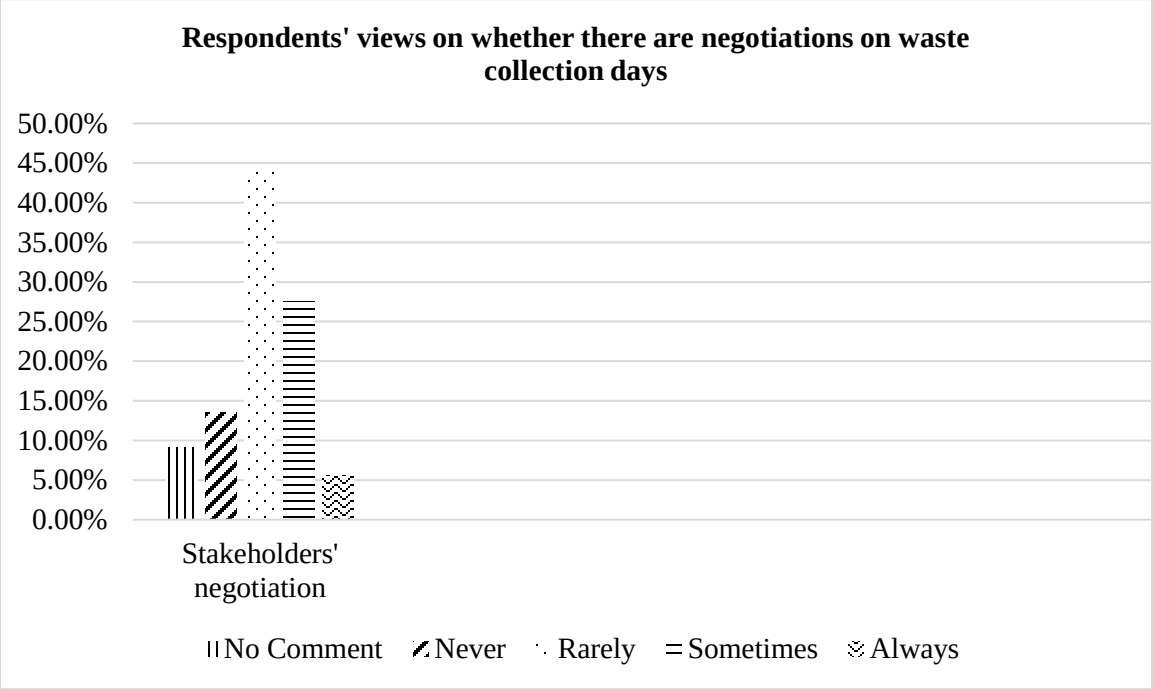


Figure 4.12: Respondent's views on whether there are negotiations in designating waste collection days

Regarding whether the designated waste collection days through negotiations are adhered to, the results as indicated in Figure 4.13 showed that a majority of the respondents (43.3%) felt that the county council rarely adheres to the designated days, 29.8% felt that the county council never adhered to the designated days, 19.3% felt that the county council sometimes adhered to the designated days and 7.6% of the respondents reserved their comments on this question. These findings agree with those by Njuguna, (2016) who in his study on Solid Waste Management in Gitambaya, Ruiru found that the major challenge leading to poor solid waste storage and collection according the residents of Gitambaya in Ruiru was delay in solid waste collection by various responsible agencies especially the Ruiru sub county. That study attributed this delays to

ignorance and negligence of standards and regulation by the environmental county council officers.

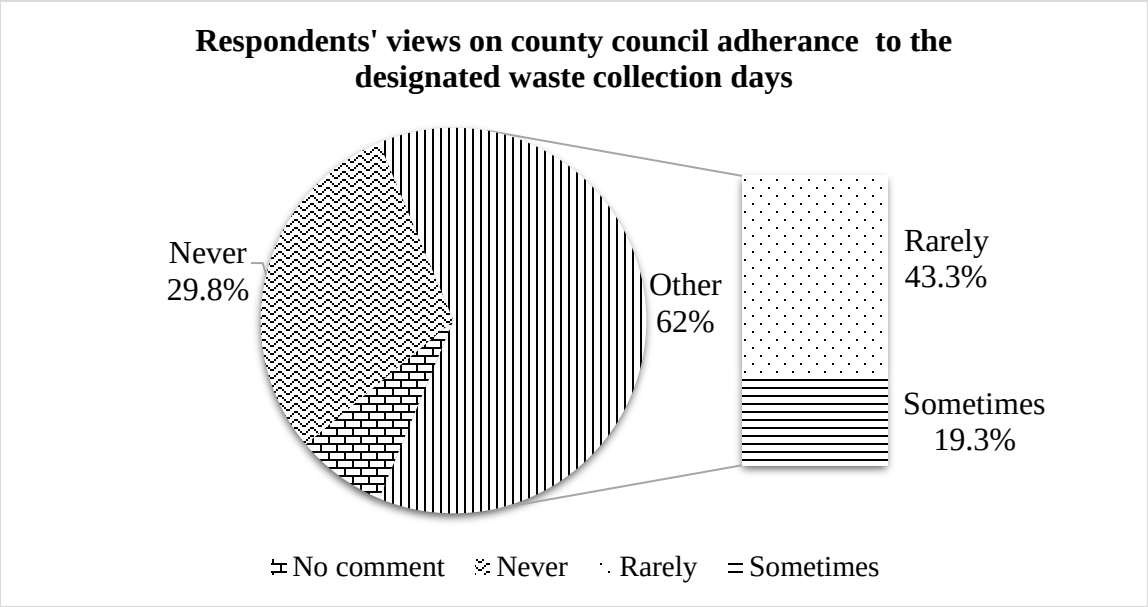


Figure 4.13: Respondent's views on whether the county council adheres to the designated waste collection days through negotiations

On whether negotiations between stakeholders improve DWM in Biashara ward the study found that majority of the respondents felt that negotiations improve domestic waste management. The results indicated that 30.4% of the respondents said that negotiations sometimes improve DWM, 28.9% of them said that negotiations always improve DWM, 21.1% said that negotiations rarely improve DWM, and 19.6% of the respondents had no comment on this as illustrated in Figure 4.14. The study deduced that there is a very strong and significant positive correlation between adherence to negotiated waste collection days and improved domestic waste management ($r=0.838$, $n=342$, $p=0.01$). The study reveals that the more the waste collectors adhere to negotiated waste collection days, the more the practice of DWM is improved.

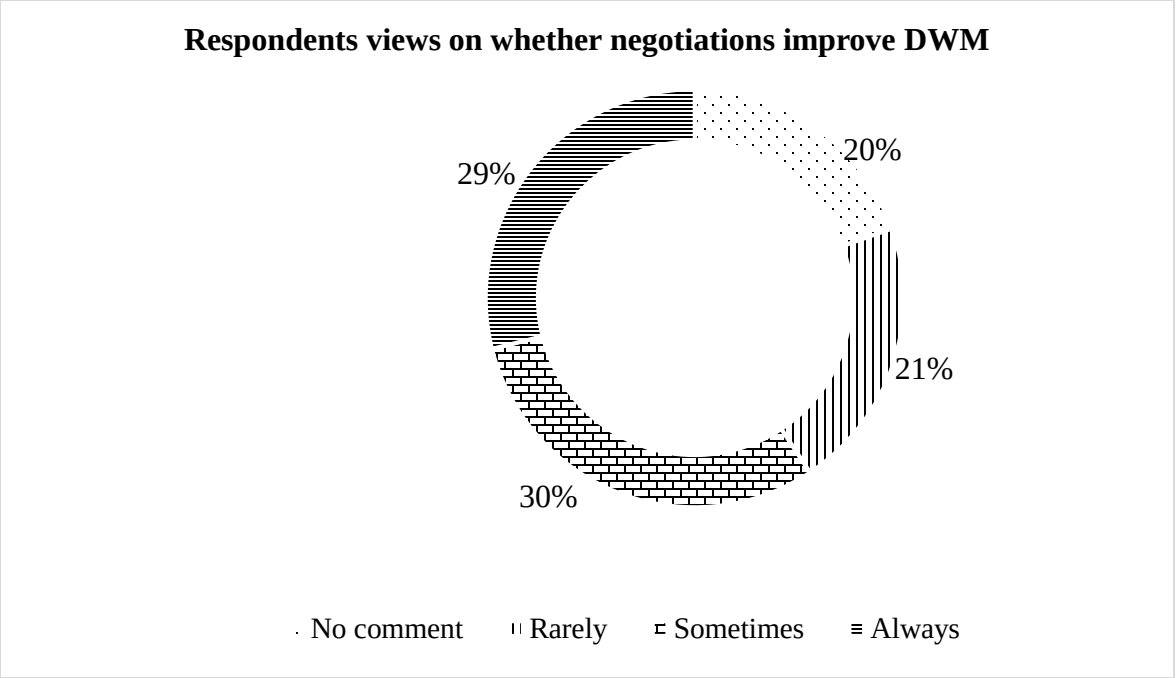


Figure 4.14: Respondents views on whether Negotiations between stakeholders improve DWM

The study also sought to find out whether the stakeholders in DWM in Biashara ward reach compromises on the cost of DWM and the effect of these methods of communication on the entire process of DWM. Payments were found to be made at different intervals and ranged from 0- 200 Kenya shillings per month as illustrated in Table 4.15. The study found that 65.5% of the respondents paid for the service monthly, 30.7% paid for collection weekly and only 3.8% of the respondents did not pay for the service. Further, the study determined that majority of the residents (52.6%) paid KSh. 200 for waste collection, 38% of the residents paid KSh. 100, 5.6% of the residents paid KSh. 150 and the remaining 3.8% did not pay for the service.

Table 4.15:Rates for Waste Collection

Cost (KSh.)	duration			
	weekly	monthly	not applicable	Total
100	55	75	0	**130(38%)**
150	0	19	0	**19(5.6%)**
200	50	130	0	**180(52.6%)**
0	0	0	13	**13(3.8%)**
Total	**105(30.7%)**	**224(65.5%)**	**13(3.8%)**	**342(100%)**

The researcher therefore asked the respondents the questions; whether stakeholders reach compromises on the cost of DWM, whether the stakeholders adhere to the prices reached through compromise and whether such compromises improve domestic waste management. The responses to these questions are captured in Table 4.16 and show that a majority of the respondents (46.5%) felt that compromises between stakeholders specifically on the cost of DWM happen rarely and when they do happen, 58.2% of the respondents felt that the cost agreed upon is rarely adhered to. However, even in light of that situation 49.7% of the respondents still felt that compromises sometimes improve DWM while 32.5% felt that compromises always improved DWM as opposed to only 8.8% and 9% of the respondents who felt that compromises rarely or never improve DWM respectively. The research deduced that there is a strong, significant positive relationship between stakeholders reaching compromises on the cost of DWM and improved DWM ($r=0.428$, $n=342$, $p=0.01$), DWM improves as stakeholders reach compromises on the cost of DWM. Similarly, there is a strong, significant positive correlation between adherence to the costs of DWM reached through compromise and improved DWM ($r=0.479$, $n=342$, $p=0.01$).

Table 4.16: Respondents' views on the influence of cost comprises on DWM in Biashara Ward

	Compromises on Cost	Adherence to compromises	Pearson Coefficient	Compromises improve DWM	Pearson Coefficient
Never	6.7%	7%	0.479	9%	0.428
Rarely	46.5%	58.2%	P Value=0.01	8.8%	P Value=0.01
Sometimes	41.2%	33%		49.7%	
Always	5.6%	1.8%		32.5%	
Total	**100**	**100**		**100**	

On the DWM process as a whole the researcher tried to find out whether the stakeholders engage in consensus building or confrontations around the various aspects of DWM. The respondents were asked whether the county council builds consensus around DWM or instead there are confrontations and whether either consensus building or confrontation improves domestic waste management in Biashara ward. Their responses are captured in Table 4.17 below and indicate that majority of the respondents (57%) felt that consensus building is sometimes done and 66.4% of the respondents believe that consensus building sometimes improves DWM. The study inferred that there is a mildly significant negative correlation between consensus building and improved DWM (r= -0.210, n=342, p=0.01). On the other hand, 46.8% of the respondents said that there are confrontations between stakeholders on some aspects of DWM and most of the respondents (38.3%) said that confrontations rarely improve DWM. The study established that there is a strong and significant positive correlation between stakeholder confrontations and improved DWM (r=0.595, n=342, p=0.01)

Table 4.17: Respondents' views on the influence of Consensus Building and Confrontation on DWM

	Consens-us Building	Consensus Building improves DWM	Pearson Coefficient (r)	Confro ntation	Confrontation improves DWM	Pearson Coefficient (r)
No Comment	11.7%	2%	-0.210	7%	9.9%	0.595 P Value=0.01
Never	18.7%	5.6%	P Value=0.01	14.6%	19.6%	
Rarely	12.6%	19.3%		19.3%	38.3%	
Sometimes	48.2%	66.4%		46.8%	31%	
Always	8.8%	6.7%		12.3%	1.2%	
Total	**100**	**100**		**100**	**100**	

4.4 Influence of stakeholder engagement frequency on domestic waste management in Biashara residential area

Another aspect of stakeholder involvement in DWM that the study looked into was how the frequency of stakeholder engagements influences DWM in Biashara. The study found that the scope of stakeholder engagements was the mandate of the county council in DWM, the role of citizens in DWM and the challenges in DWM in Biashara residential area.

On the mandate of the county council in DWM, the researcher found out from the Ruiru sub-county environment office that the mandate of the Environment office was to coordinate waste collection within Ruiru sub-county, lisencing private waste collectors, educating the licensed private waste collectors in the appropriate waste collection practices and supervision of sewerage disposal in the subcounty. Ruiru sub- county is sub- divided into eight (8) wards namely Gitothua, Biashara, Gatong'ora, Kahawa Sukari, Kahawa Wendani, Kiuu, Mwiki and Mwihoko. The Environment sub-county office coordinates waste collection in these eight admintrative areas. This is line with the second requirement by the National Environment Management

Authority which states that the municipal councils should ensure that all municipal activities should ensure that waste is removed regularly and in a timely manner so that it does not become an eyesore. Further, in line with the four requirements of ensuring the municipal council have all the waste removed from the streets by ensuring there are enough waste transport vehicles so that there is no waste on streets, the Sub- county environment office says that there are 3 (three) waste collection trucks owned by the county while they have currently licensed 7 (seven) collection trucks. Private Companies are licensed at 15, 000/= (Fifteen Thousand Shillings) per year while youth groups, Community based organizations and self-help groups are licensed at 3, 000/= (Three Thousand Shillings) per year to encourage more of them. After licensing, the Environment office provides training to these collectors on how to go about waste collection.

The researcher also wanted to determine the respondents' views on whether citizens have a role to play in waste management 96.6% of the respondents felt that citizens had a role to play and only 3.4% of the respondents felt they did not. Interestingly, 25% of the respondents did not however know exactly what their role would be in domestic waste management as illustrated in Figure 4.15, 48.4% of those sampled felt that by dumping responsibly they would have played their role in waste management, 19.7% of the respondents felt that their contribution would be through sticking to the dumping schedule while 5.3% felt that paying for waste collection was their role in DWM.

The Sub- county Environment Officer also felt that citizens could get involved in waste management by engaging in better storage of waste and cooperating with waste collectors attached to the vans by removing waste on days when it is scheduled to be collected.

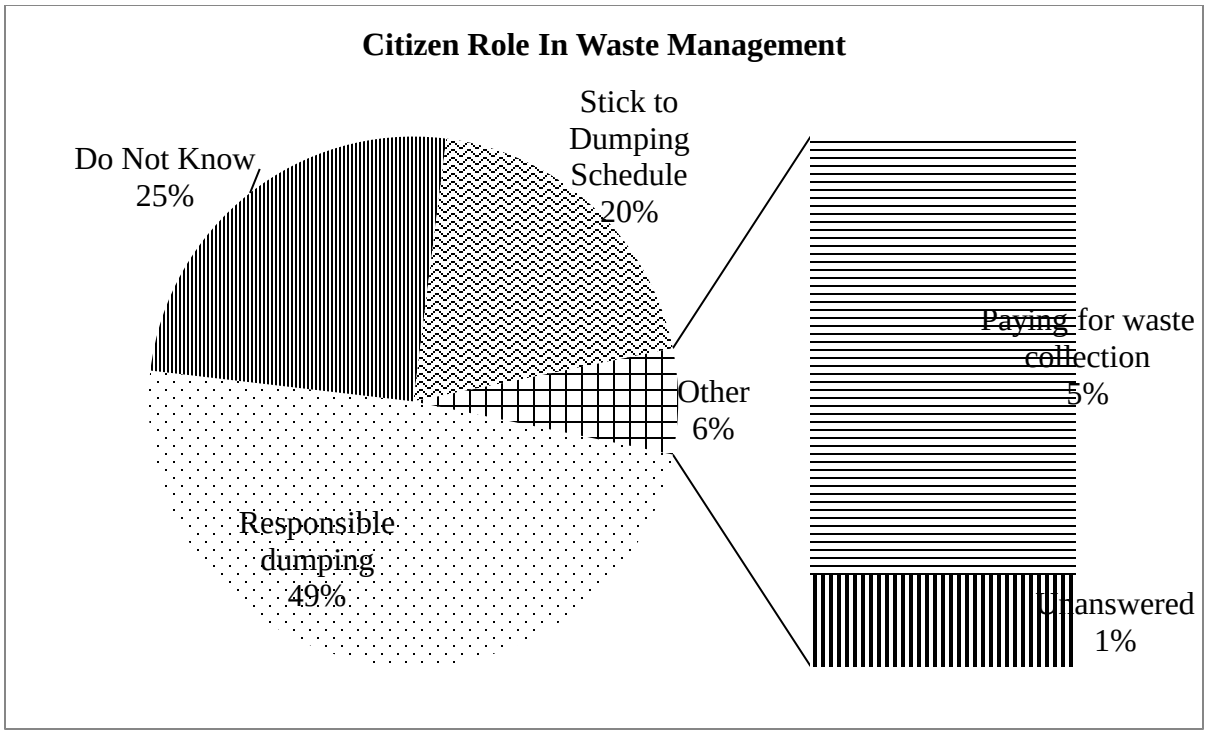


Figure 4.15: Respondents' views on the Role of Citizens in Waste Management

As illustrated in Figure 4.16, the challenges in DWM in Biashara Residential area as explained by the Sub- county Environment officer include inadequate resources which was cited as the biggest impediment in the DWM practice at 50%. This is in terms of collection trucks and personnel to work in collection. The Sub- County currently owns only three (3) collection trucks for the eight areas of administration in Ruiru sub- county. Further, only two (2) workers are attached to each of these trucks meaning that only six waste collection workers are available for a population of 201, 986 KNBS, (2009) and an area of 179.90 Sq. Km. This problem is compounded by the fact that there are emergency collections required in different wards over the course of the week and that interferes with the waste collection schedule.

The other challenge cited was that of inaccessibility of some of the areas for waste collection. The roads leading to most of the areas are really bad especially when it rains. Access roads are also tended to be very narrow in some areas while the collection trucks are large and therefore

cannot fit. The researcher also found that the waste collection officers attached to the collection trucks experience certain challenges in the course of their duty. Key among these challenges is lack of cooperation from citizens. Citizens fail to store their waste well and to remove it when the collection trucks are scheduled to make collections but instead remove it days before the scheduled day. This leaves the waste exposed to scavenging by animals like dogs leaving the environment scattered with waste.

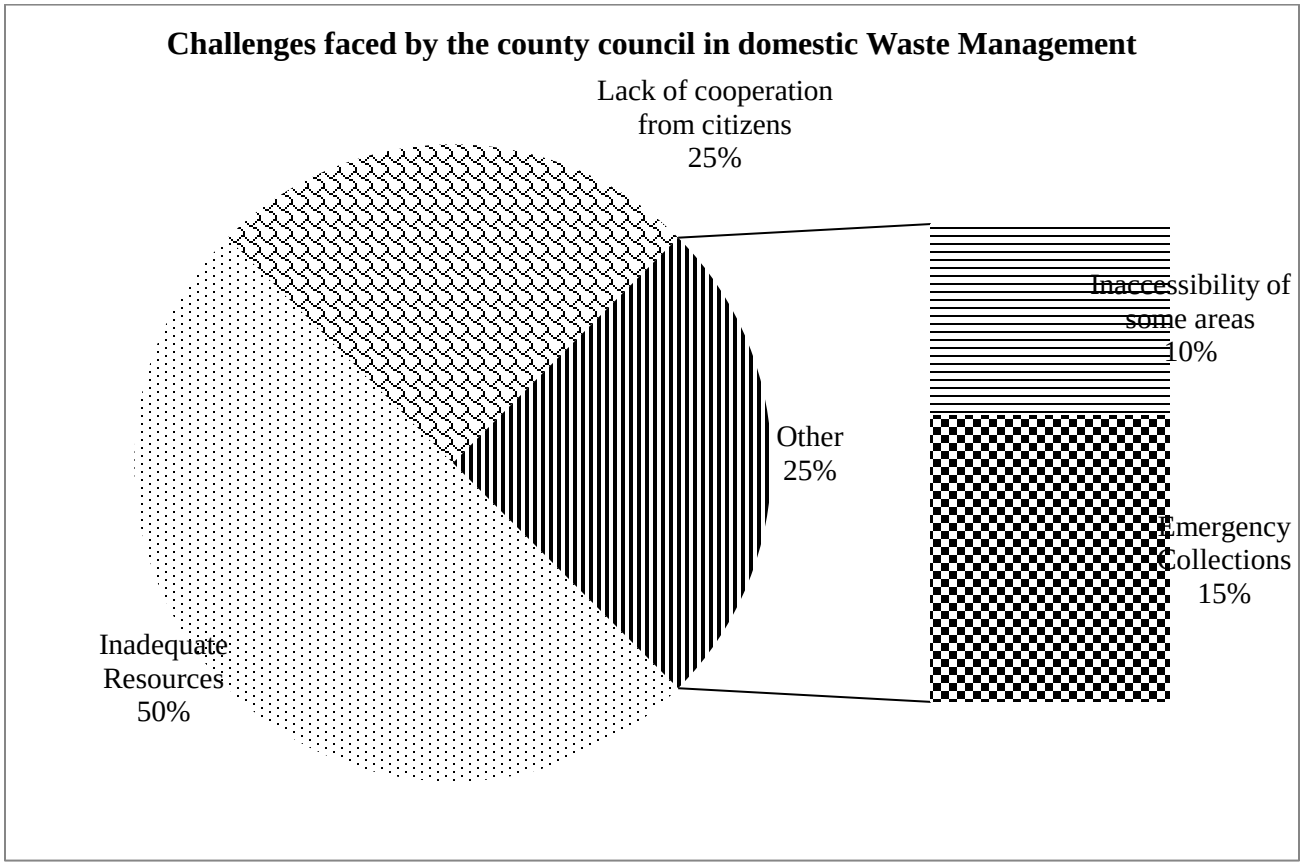


Figure 4.16: Challenges faced by the county council in domestic waste management

The researcher sought to find out whether stakeholder engagements are carried out to address the outstanding issues on an ongoing basis, multiple times a year, annually, monthly or on ad-hoc basis. The results as captured in Table 4.18 showed that stakeholder engagements are carried out in Biashara residential area with 41.8% of the respondents disagreed that stakeholder

engagements are carried out on an ongoing basis, 40.1% fairly agreed that engagements are carried out multiple times a year, 37.7% agreed that engagements are carried out annually and 48.5% fairly agreed that engagements are carried out on an ad-hoc basis.

Table 4.18: Respondent's views on the frequency of Stakeholder Engagements in Biashara residential area

	Ongoing	Multiple times a year	Annually	Monthly	Ad-hoc Basis
Strongly Disagree	0%	0%	2.9%	9%	2.2%
Disagree	41.8%	29.8%	21.1%	17%	9.9%
Fairly Agree	35.7%	40.1%	14%	16.7%	48.5%
Agree	22.5%	24%	37.7%	46.8%	29.2%
Strongly Agree	0%	6.1%	24.3%	10.5%	10.2%
Total	**100**	**100**	**100**	**100**	**100**

Having established that stakeholder engagements are carried out at some level, the researcher sought to find out the scope of the stakeholder engagements. The study established that the county council and the private waste collectors invited views from the citizens on how they can improve the DWM processes in Biashara residential area. As illustrated in Figure 4.17 the researcher sought to find out from the household respondents their views on how the DWM process can be improved and the results indicated that majority of the respondents, 41.6% felt that citizens needed to be educated on waste management, 22.1% felt that waste collection frequency should be increased, 17.6% felt that the county council needed to designate waste dumping areas, and the remaining 18.7% felt that the cost of waste collection services should be reduced. These findings are in line with the responses from the sub- county environment officer who felt that there was need for educating the citizens on waste management.

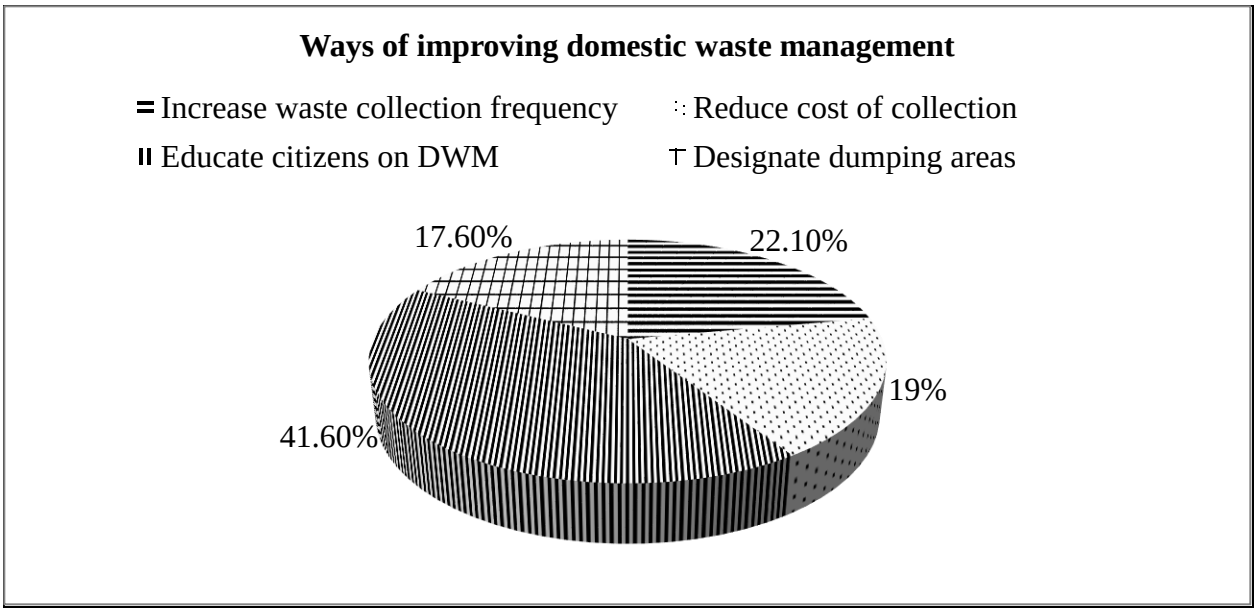


Figure 4.17: Ways of Improving Domestic Waste Management

The researcher then sought to determine whether the stakeholder engagements carried out are adequate and whether they improve DWM in Biashara ward. The respondents' views on the adequacy of stakeholder engagements are represented in the Table 4.19 and they indicate that 52.9% of the respondents disagree that ongoing stakeholder engagements are adequate, 40.4% disagreed that engagements multiple times a year are adequate, 43.6% strongly disagreed that annual stakeholder engagements are adequate, 33.9% strongly disagreed that monthly engagements are adequate and 32.5% of the respondents disagreed that ad-hoc engagements are adequate. The results show that across the board the stakeholders feel that the frequency of stakeholder engagements is not adequate.

Table 4.19: Respondent's views on the adequacy of Stakeholder Engagements in Biashara Ward

	Ongoing	Multiple times a year	Annually	Monthly	Ad-hoc Basis
Strongly Disagree	2.9%	2.9%	43.6%	33.9%	21.3%
Disagree	52.9%	40.4%	24.3%	25.4%	32.5%
Fairly Agree	39.5%	39.8%	27.5%	11.7%	26.3%
Agree	4.1%	13.4%	4.4%	17.3%	17.3%
Strongly Agree	0.6%	3.5%	0.3%	11.7%	2.6%
Total	**100**	**100**	**100**	**100**	**100**

Further, the study sought to establish how the frequency of stakeholder engagements influences DWM. The results are captured in Figure 4.18 and indicated that 45.9% of the respondents agreed that ongoing stakeholder engagements improve DWM, 43.9% agreed that stakeholder engagements multiple times a year improve DWM, 38.3% agreed that annual stakeholder engagements improve DWM, 34.5% agreed that monthly engagements improve DWM and 60.2% of the respondents agreed that stakeholder engagements on an ad-hoc basis improve DWM.

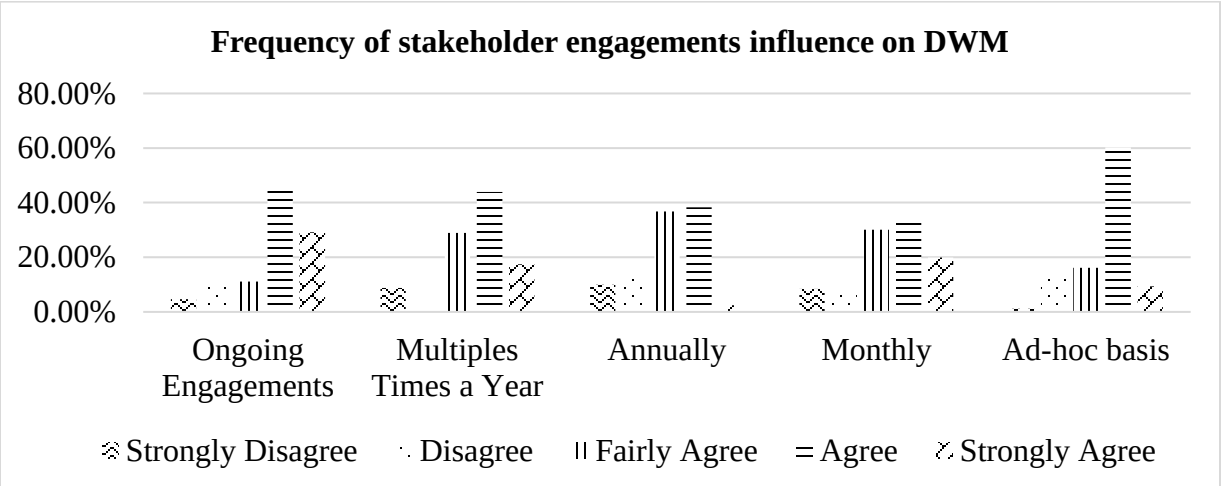


Figure 4.18: Respondent's views on whether the frequency of Stakeholder Engagements improve DWM in Biashara Ward

On the correlation between the frequency of stakeholder engagement and improved DWM the study established that there is a significant, strong negative correlation between ongoing engagements and improved DWM (r= -0.518, n=342, p=0.01). Equally, the study established that there is no significant correlation between stakeholder engagements carried out multiple times a year and improved DWM and that the correlation that exists is negative (r= -0.077, n=342, p=0.157). Additionally, the study determined that there is a mild and significant positive relationship between stakeholder engagements carried out annually and improved DWM (r=0.197, n=342, p=0.01) while there was found to be significant, strong negative correlation between monthly stakeholder engagements and improved DWM (r= -0.422, n=342, p=0.01). Lastly, the study inferred that significant moderately positive relationship between ad hoc stakeholder engagements and improved DWM (r=0.239, n=342, p=0.01).

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS OF THE STUDY

5.1 Summary of findings

On the influence of stakeholder participation strategies on DWM, the study established that; Waste separation, is carried out across the levels of education by majority of the respondents and there is a statistically significant positive correlation between level of education and separation of waste. On waste storage, the results illustrated that majority of the respondents felt that it was through consultations that they had been able to use storage techniques, and it was determined that there is a significant positive correlation between stakeholder consultations on waste storage techniques and improved DWM. With regards to waste collection, the study established that less than half of the respondents felt that stakeholder partnerships were used to designate waste collection sites and that there is a moderately positive correlation between use of stakeholder partnerships in designating waste collection points and improved DWM. The study established that there is a significant positive correlation between using stakeholder dialogues to designate waste collection days and the level of satisfaction with the waste collection services provided. On waste transport, the results indicated that majority of the respondents felt that stakeholder partnerships improved waste collection and transportation, and that there is a weak positive correlation between stakeholder partnerships in waste collection and transport and improved DWM.

The second objective was to determine the influence of stakeholder forums and communication practices on domestic waste management in Biashara residential area. Majority of the respondents felt that there were inadequate DWM people surveys carried out in Biashara residential area and there is a strong positive correlation between the adequacy of people surveys carried out and improved DWM. Majority of the respondents also agreed that stakeholder

meetings improve transport in DWM but there is a significant strong positive correlation between adequacy of partner meetings and improved DWM. Majority of the respondents disagreed with the assertion that citizen panels and workshops are held in Biashara residential area with a focus on final waste disposal. There is a weak but significant positive correlation between organization of citizen panels to and improved DWM and a moderate positive correlation between organizing citizen workshops for DWM and improved DWM. On stakeholder's communication practices, majority of the respondents felt that consultations sometimes improve DWM and there is a significant moderate positive correlation between consultations on appropriate DWM practices and improved DWM. Majority of the respondents also felt that there is a very strong and significant positive correlation between adherence to negotiated waste collection days and improved DWM. There is a strong, significant positive relationship between stakeholders reaching compromises on the cost of DWM and improved DWM. Further majority of the respondents felt that consensus building could sometimes improve DWM and that there is a mildly significant negative correlation between consensus building and improved DWM. Additionally, majority of the respondents acknowledged that confrontations rarely improve DWM and that there is a strong and significant positive correlation between stakeholder confrontations and improved DWM.

The third objective was to determine the influence of stakeholder engagement frequency on domestic waste management in Biashara residential area. The study established that stakeholder engagements around these areas are carried out to on an ongoing basis, multiple times a year, annually, and monthly or on ad-hoc basis. Majority of the respondents felt that stakeholder engagements are carried out on an ad-hoc basis followed in frequency by the monthly stakeholder engagements. The researcher then sought to determine whether the stakeholder

engagements carried out are adequate and established that majority of the respondents were of the opinion that ongoing stakeholder engagements, multiple times a year engagements, annual engagements, monthly engagements and ad-hoc engagements were inadequate. The study established that there is a correlation between the frequency of stakeholder engagement and improved DWM. There is a significant, strong negative correlation between ongoing engagements and improved DWM and there is no significant correlation between stakeholder engagements carried out multiple times a year and improved DWM and that the correlation that exists is negative. Additionally, the study determined that there is a mild and significant positive relationship between stakeholder engagements carried out annually and improved DWM while there was found to be significant, strong negative correlation between monthly stakeholder engagements and improved DWM.

5.2 Conclusions of the Study

The study concluded that; Stakeholder involvement strategies like empowerment, partnerships, dialogues and consultations are important elements in improving waste separation at source, storage techniques, waste collection and transport services. Stakeholder involvement forums like surveys, stakeholder meetings, citizen panels and workshops also improve significant aspects of waste management processes like waste transport. In terms of communication practices like consultation, negotiations, compromises and confrontations are also significant in improving the cost aspect of domestic waste management. Consensus building was however found to have a negative correlation with improved domestic waste management. In terms of the frequency of stakeholder involvement, a need based approach was also found to improve domestic waste management. Community involvement is crucial to the success of waste management at the local level. There however needs to be structured stakeholder engagement to coordinate all efforts

towards the common goal of improving domestic waste management and for sustainability of the process.

5.3 Recommendations of the study

Based on the findings of this research, the following recommendations should be considered;

- With regards to stakeholder participation strategies, aside from empowering citizens to recycle their waste, more educational programs/awareness creation should be offered to the citizens on all the aspects of domestic waste management to enable them play their rightful role in domestic waste management. More dialogues, consultations and partnerships between the residents and those in charge of domestic waste management in Biashara residential area should be held on various aspects of the DWM process as the study has established this would improve the process.
- Regarding stakeholder forums and communication practices, the researcher recommends a significant increase in the number of stakeholder forums to address the inadequacy of the same as pointed out in this study. Stakeholder surveys, meetings and workshops should be embraced as they can help identify the challenges on the ground in the DWM process and the suitable solutions for such problems may come from the citizens themselves as they know their problems better. Further, the Environment office should be allocated more funds for it to be able to adequately carry out such forums for feedback on the services they offer. Regarding stakeholder communication practices on DWM in Biashara residential area, the study recommends more consultations between stakeholders where decisions have not been made before and such consultations are just a formality. Negotiations, compromises and consensus building are also recommended by the study as they were established

to sometimes improve DWM. However, such negotiations, compromises and consensus building outcomes should be adhered to by concerned stakeholders if they are to yield an improvement in domestic waste management in the area.

- On the frequency of stakeholder engagements regarding DWM, the study recommends measured engagements on the various aspects of the DWM process. More stakeholder engagements were found to have a negative influence on the improvement of DWM therefore this study recommends making those engagements impactful by having them based on need so as to address the challenges cited in the study.

5.4 Recommendations for further studies

Stakeholder participation has been identified as a prerequisite for improved DWM, further studies are recommended into the factors that influence stakeholder participation, the challenges in enlisting stakeholder participation and the ways of enhancing the participation for effectiveness domestic waste management in Biashara residential area.

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APPENDICES

APPENDIX I: LETTER OF INTRODUCTION

KENYATTA UNIVERSITY

SCHOOL OF ENVIRONMENTAL STUDIES

Dear Sir/ Madam,

RE: AN INVESTIGATION OF THE INFLUENCE OF STAKEHOLDER PARTICIPATION ON DOMESTIC WASTE MANAGEMENT IN BIASHARA RESIDENTIAL AREA, RUIRU MUNICIPALITY KIAMBU COUNTY, KENYA

I am a post graduate student wishing to carry out a research on the above-mentioned topic. The questionnaire attached is meant to gather information for this study. All information given will be treated with utmost confidentiality and privacy. Name or any other form of identity shall not be required by any individual when filling out questionnaire. You are kindly requested to respond to all items in the questionnaire in open honesty. Your positive response will be highly appreciated.

Thank you in advance for your cooperation.

Yours sincerely,

NDURURI JANET

APPENDIX II: QUESTIONNAIRE FOR HOUSEHOLD HEADS AND BUSINESS OPERATORS

Dear respondent,

The questionnaire hereby attached is a data collection instrument for an academic research to **investigate of the influence of stakeholder participation on domestic waste management in Biashara residential area, Ruiru municipality Kiambu County, Kenya.**

You are hereby kindly requested to fill the questionnaire to aid in the research. Please note that this research is purely for academic purposes and that any responses given here will be treated with utmost confidentiality. Consequently, the names of the respondents are not required.

Your contribution will be highly appreciated.

Please tick [√] where appropriate or fill in the required information on the spaces provided.

Section A: General Information.

(Tick where appropriate)

1. What is your gender?

   □Male □Female

2. What is your highest level of education?

Level of education	Tick appropriately (√)
Post graduate	
Bachelor's Degree	
Diploma	
Certificate	
Secondary School	
Primary School	

3. What is your income level? (KSH)

Income level (KSH)	Tick Appropriately (√)
50000 and above	
30000 – 49999	
29999 – 20000	
19,999 – 10,000	
10,000 and below	

4. What is your understanding of waste materials?

……

5. What is the common waste you dispose from your premises?

……

6. Which kind of containers do you use?

Kind of Waste Container	Tick Appropriately (√)
Plastic bins	
Plastic paper bags	
Metal bins	
Sacks	

7. Who provides the containers?

Provider of Waste Container	Tick Appropriately (√)
County council	
Private company	
Landlord/Caretaker	
Others, specify	

8. How often do you empty your waste?

Frequency of emptying waste	Tick Appropriately (√)
Once per week	
Twice per week	
Once per month	
Twice per month	
Others, specify	

9. Who collects your waste for disposal?

Waste collection responsibility	Tick Appropriately (√)
County Council	
Private Company	
Others, specify	

10. Do you pay for the waste collection service?

Payment for Waste collection	Tick Appropriately (√)
YES	
NO	

If yes, how much do you pay and how often do you pay?

……

11. How do you rate this service?

…….

12. Do you know how your waste is disposed? .....

If yes, how is your waste disposed?

……

Section B: Stakeholder Participation Strategies' influence on Domestic Waste Management

13. In the table below, rate the extent to which you agree with the following statements on the influence of stakeholder participation on domestic waste management practices in your area.

Key: **SA**- Strongly Agree **A**- Agree **SD**- Strongly Disagree **D**- Disagree **U**- Undecided

Statement	SA	A	SD	D	U
	5	4	3	2	1
Proper waste separation is carried out					
There is reuse of domestic waste					
Stakeholders are empowered to carry out recycling of domestic waste					
Appropriate waste storage techniques are employed by stakeholders through consultations					
Designated waste collection points are provided through stakeholder partnerships					
Through dialogue, stakeholders have designated days for waste collection					
The waste collectors always adhere to the designated days for waste collection					
Through consultation waste collection service are satisfactory					
Stakeholders' partnerships have improved waste collection and transportation.					
Consultations between stakeholders have increased the efficiency of domestic waste management					
Empowerment of stakeholders to carry out recycling has increased the efficiency of domestic waste management					
Stakeholder partnerships have improved domestic management					
There is adequate dialogue among stakeholders					
Stakeholders are empowered to tackle domestic waste management challenges					
There are adequate consultations among stakeholders					
There is adequate dialogue among stakeholders					

Section C: Stakeholder forums' influence on Domestic Waste Management

14. In the table below, rate the extent to which you agree with the following statements on the influence of stakeholder forums on domestic waste management in your area.

Key: **SA**- Strongly Agree **A**- Agree **SD**- Strongly Disagree **D**- Disagree **U**- Undecided

Statement	SA	A	SD	D	U
	5	4	3	2	1
The county council carries out domestic waste management people surveys					
Domestic waste management people surveys carried out are adequate					
Domestic waste management people surveys improve domestic waste management practices among residents					
Partner meetings are held between residents, business operators and the county council					
The partner meetings held are adequate					
Domestic waste management practices of the residents and business owners improve due to partner meetings					
Residents and business owners hold tenants' meetings					
Tenant meetings improve the domestic waste management practices of residents and business owners					
The county council organizes citizen panels to discuss domestic waste management issues					
The citizen panels are effective forums for improving domestic waste management practices					
The county council organizes stakeholder workshops on domestic waste management					
The county council sensitizes residents on proper domestic waste management methods during the stakeholder workshops					
Stakeholder workshops are effective channels of improving domestic waste management practices by residents and business owners					

Section D: Influence of stakeholder's communication practices on domestic waste management

15. In this section the researcher intends to find out how stakeholder's communication practices influence domestic waste management in your area. For each of the following statements, please indicate **(by ticking)** in the correct box after each statement the extent to which you agree with them. Use the following scale:

    Always (**A**), Sometimes (**ST**), Rarely (R), Never (**N**) or No Comment (**NC**).

Statement	A	ST	R	N	NC
	5	4	3	2	1
There are meaningful consultations among stakeholders on the appropriate domestic waste management practices					
Regular consultations between stakeholders improves the domestic waste management practices					
The county council negotiates with residents and business owners on domestic management issues such as waste collection days					
The county council adheres to the negotiated days for waste collection					
Negotiations between the county council, residents and business owners improves domestic waste management					
The county council, the residents and business operators are able to reach compromises on domestic waste management issues such as the cost of waste collection					
The county council adheres to the amounts reached on compromise with their clients					
Compromises between the county council, residents and business operators improves domestic waste management					
The county council builds consensus with the residents and business operators on domestic waste management aspects					
Consensus building among stakeholders improves domestic waste management					
There are confrontations between the county council and the residents and business operators on some aspects of domestic waste management					
Confrontations between the stakeholders improve domestic waste management					
Avoiding confrontations between stakeholder improves domestic waste management					

Section E: Frequency of stakeholder engagement's influence domestic waste management

16. In the table below, indicate whether you agree or disagree with the statement given regarding the frequency of stakeholder engagements and how that influences domestic waste management.

Key: **SA** – Strongly agree; **A** – Agree; **FA** – Fairly Agree; **D** – Disagree; **SD** – Strongly disagree

Statement	**SA**	**A**	**FA**	**D**	**SD**
	5	**4**	**3**	**2**	**1**
Stakeholder engagements are carried out on an ongoing basis					
Stakeholder engagements carried out on an ongoing basis are adequate					
Ongoing stakeholder engagement improves domestic waste management					
Stakeholder engagements are carried out multiple times a year					
Stakeholder engagements carried out multiple times a year is adequate					
Stakeholder engagements carried out multiples times a year improve domestic waste management					
Stakeholder engagements are carried out on an annual basis					
Annual stakeholder engagements are adequate					
Annual stakeholder engagements improve domestic waste management					
Stakeholder engagements are carried out on a monthly basis					
Monthly stakeholder engagements are adequate					
Monthly stakeholder engagements improve domestic waste management					
Stakeholder engagements are carried out on an ad hoc basis					
Ad hoc stakeholder engagements are adequate					
Ad hoc stakeholder engagements improve domestic waste management					

APPENDIX III: INTERVIEW SCHEDULE FOR THE SUB-COUNTY ENVIRONMENTAL OFFICER AND THE PRIVATE WASTE COLLECTORS

1. In your opinion, what is the role of the following stakeholders in domestic waste management; County council, Private waste collectors, Community members.
2. What are the challenges you (County council or Private collector) have faced in domestic waste management in Biashara residential area?
3. What would you propose be done by all stakeholders to improve the current domestic waste management situation in Biashara residential area?
4. Enumerate some of the stakeholder participation strategies that you (County council or Private collector) use in the practice of domestic waste management in Biashara residential area.
5. Of the above-mentioned stakeholder participation strategies;
    i. Which one(s) would you (County council or Private collector) say you employ in tackling waste separation and recycling in Biashara residential area?
    ii. Which one(s) would you say you (County council or Private collector) utilize in dealing with waste collection in Biashara residential area?
    iii. How would you say that the use (or lack of) of the stated stakeholder participation strategy influences domestic waste management in Biashara residential area?
6. Enumerate some of the forums in which stakeholder involvement is carried out in Biashara residential area.
7. Of the above-mentioned stakeholder participation forums;

i. Which one(s) would you (County council or Private collector) say you employ in tackling waste transportation in Biashara residential area?

ii. Which one(s) would you say you (County council or Private collector) utilize in dealing with final waste disposal in Biashara residential area?

iii. How would you say that the use (or lack of) of the stated stakeholder participation forum influences domestic waste management in Biashara residential area?

8. Enumerate the communication strategies used among stakeholders of domestic waste management in Biashara residential area.
9. Of the above-mentioned stakeholder communication strategies;

   i. Which one(s) would you (County council or Private collector) say you employ in tackling waste collection in terms of waste collection days in Biashara residential area?

   ii. Which one(s) would you say you (County council or Private collector) utilize in dealing with waste collection in terms of waste collection costs in Biashara residential area?

   iii. How would you say that the use (or lack of) of the stated stakeholder communication strategies influences domestic waste management in Biashara residential area?

10. What would you say is the frequency of stakeholder engagements on domestic waste management in Biashara residential area?
11. How do you feel the frequency of stakeholder engagements influences domestic waste management in Biashara residential area?

APPENDIX IV: RESEARCH AUTHORIZATION LETTER, KENYATTA UNIVERSITY

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 020-8704150

Our Ref: N50/CTY/PT/26802/13

DATE: 6th June 2016

Director General,
National Commission for Science, Technology
& Innovation
P.O. Box 30623-00100,
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR NDURURI JANET WAITHERA– REG. NO. N50/CTY/PT/26802/2013

I write to introduce Ms. Ndururi Janet Waithera who is a Postgraduate Student of this University. She is registered for M.Env Degree programme in the Department of Environmental Studies & Community Development.

Ms. Ndururi intends to conduct research for an M.Env. Proposal entitled, "Stakeholder Participation in Waste Management in Biashara Residential Area, Ruiru Municipality Kiambu County, Kenya"

Any assistance given will be highly appreciated.

Yours faithfully,

MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL

EO/nn

APPENDIX V: RESEARCH AUTHORIZATION LETTER, NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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Email:dg@nacosti.go.ke
Website: www.nacosti.go.ke
when replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/16/23605/12684**

Date: **29th August, 2016**

Janet Waithera Ndururi
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Stakeholder participation in domestic waste management in biashara residential area, Ruiru Municipality Kiambu County, Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Kiambu County** for the period ending **26th August, 2017.**

You are advised to report **the County Commissioner and the County Director of Education, Kiambu County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Kiambu County.

The County Director of Education
Kiambu County.

APPENDIX VI: RESEARCH CLEARANCE PERMIT, NACOSTI

THIS IS TO CERTIFY THAT:
MS. JANET WAITHERA NDURURI
of KENYATTA UNIVERSITY, 0-232
RUIRU,has been permitted to conduct
research in *Kiambu County*

on the topic: *STAKEHOLDER PARTICIPATION IN DOMESTIC WASTE MANAGEMENT IN BIASHARA RESIDENTIAL AREA, RUIRU MUNICIPALITY KIAMBU COUNTY, KENYA*

for the period ending:
26th August,2017

Permit No : NACOSTI/P/16/23605/12684
Date Of Issue : 29th August,2016
Fee Recieved :Ksh 1000

.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation