

**SOLID WASTE MINIMIZATION PRACTICES IN KIGANJO, THIKA SUB-COUNTY,
KIAMBU COUNTY, KENYA**

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PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE
DEGREE OF BACHELOR OF EDUCATION (ARTS) OF GREYSA UNIVERSITY.**

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DECLARATION

DECLARATION

This project is our original work and has not been presented for award of a degree or for any similar purpose in any other institution.


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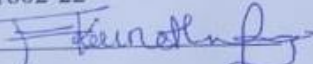
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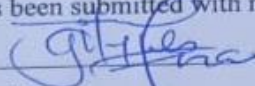
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DEDICATION

We dedicate this research project to our esteemed lecturers and academic mentors, whose guidance and encouragement have been instrumental in shaping our pursuit knowledge. We also extend this dedication to our fellow students and the entire academic community, who continue to inspire collaboration, critical thinking and innovation. Above all, this work is dedicated to the advancement of education and research, with the hope that it will contribute meaningfully to both scholarship and society.

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Table of Contents

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
LIST OF TABLES	viii
LIST OF FIGURES	ix
DEFINATION OF TERMS.	x
ABSTRACT	xi
CHAPTER ONE:	
INTRODUCTION	Error! Bookmark not defined.
1.1 Background to the Study	12
1.2 Statement of the Problem	13
1.3 Purpose of the Study	14
1.4 Conceptual Framework	14
1.5 Research Questions	15
1.6 Research Objectives	15
1.6.1 General Objectives	15
1.6.2 Specific Objectives	15
1.7 Hypothesis of the Study	15
1.8 Significance of the Study	16
1.9 Scope of the Study	16
2.0 Limitation of the Study	16
CHAPTER TWO: LITERATURE REVIEW	17
2.0 Introduction	17
2.1 Influence of Waste Segregation on Solid Waste Minimization in Kiganjo	17
2.2 Influence of Waste Recycling on Solid Waste Minimization in Kiganjo	17
2.3 Influence of Proper Housekeeping on Solid Waste Minimization in Kiganjo	18
2.4 Influence of Education Level of the Household Head on Solid Waste Minimization in Kiganjo	18
2.5 Influence of Household Income on Solid Waste Minimization in Kiganjo	18

2.6 Theoretical Framework	19
2.7 Summary of Identified Gaps in the Reviewed Literature	19
CHAPTER THREE: RESEARCH METHODS	20
3.0 Introduction.....	20
3.1 Research Design	20
3.2 Study Area	Error! Bookmark not defined.
3.3 Target Population	Error! Bookmark not defined.
3.4 Sampling Techniques.....	Error! Bookmark not defined.
3.5 Sample Size	20
3.6 Measurements of Variables.....	21
3.7 Data Collection Tools.....	21
3.8 Validity of Measurements	21
3.9 Reliability of Measurements	22
3.10 Data Collection Techniques.....	Error! Bookmark not defined.
3.11 Data Analysis.....	Error! Bookmark not defined.
3.12 Logistical and Ethical Considerations.....	Error! Bookmark not defined.
CHAPTER FOUR: FINDINGS AND DATA PRESENTATION	23
4.2 Influence of Waste Segregation on Waste Minimization.....	24
4.2.1 Descriptive Analysis.....	24
4.2.2 Correlation Analysis	25
4.3 Influence of Waste Recycle on Waste Minimization.....	27
4.3.1 Descriptive Analysis.....	27
4.3.2 Cross-tabulation analysis	27
4.3.3 Correlation Analysis	28
4.4 Influence of Proper Housekeeping Practices on Waste Minimization.....	30
4.4.1 Descriptive Analysis.....	30
4.4.2 Cross-Tabulation Analysis	30
4.4.3 Correlation Analysis	31
CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS.....	34
5.0 Introduction.....	34
5.1 Key Findings.....	34

5.1.1 Influence of Waste Segregation on Waste Minimization.....	34
5.1.2 Influence of waste recycling on waste minimization	34
5.1.3 Influence of proper housekeeping on waste minimization	35
5.2 Conclusion	35
5.3 Recommendations	35
5.4 Suggestions for Further Research	36
REFERENCES.....	Error! Bookmark not defined.
6.1 QUESTIONNAIRE.....	Error! Bookmark not defined.
6.2 Interview Guiding Questions.....	43

LIST OF TABLES

Table 1 measurement of variables	21
Table 2 Demographic information of the respondents	23
Table 3 Results of cross-tabulation analysis showing waste segregation behavior in Kiganjo....	24
Table 4 Results of correlation analysis showing the relationship between waste segregation and waste minimization	25
Table 5 Result of cross tabulation analysis showing the relationship between wastes recycle behavior and how often it is carried out.....	27
Table 6 Results of correlation analysis showing the relationship between waste recycling and waste minimization	28
Cross tabulation analysis was done to bring out the relationship between sorting of waste into categories and how often spaces are cleaned and organized. Results were as presented in Table 7.	
Table 7 Results of cross tabulation analysis showing the relationship between sorting of waste and space cleaning	30
Table 8 Results of correlation analysis showing the relationship between proper housekeeping practices and waste minimization	31

LIST OF FIGURES

Figure 1 Conceptual Framework	15
Figure 2 A doughnut showing the presence of waste segregation at Kiganjo	24
Figure 3 Bar Graph showing types of waste segregated.....	26
Figure 4 Bar graph showing waste segregation factors	26
Figure 5 A pie chart showing recycling participation.....	27
Figure 6 A bar graph showing types of waste recycled	29
Figure 7 A bar graph showing motivations influencing recycling behavior	29
Figure 8 a bar graph showing frequency of housekeeping practices	30
Figure 9 Doughnut of frequency of composting organic waste.....	32
Figure 10 Pie-chart of response on reuse	32

DEFINATION OF TERMS.

Scavengers- These are people who make a living out of open air dumpsites by looking for food and other economically useful items.

Domestic solid waste management practices-is the separation, storage, collection, reuse, reduce, recycling, transportation and final disposal in an environmentally sustainable manner.

Recycling -is a procedure in which waste materials are converted into new materials, substances and items.

Domestic waste segregation-is isolating wastes as per how it is dealt with or handled.

Reusing- entails taking any product or product parts and using them again in the original use or for a different.

Population is defined as the total group of persons, events, or things of interest the researcher needs to examine.

Proper housekeeping: this is a clean, comfortable, safe and environmental friendly area.

ABSTRACT

This study investigated waste minimization practices in Kiganjo, in response to the growing environmental and health concerns associated with solid waste management. Guided by Fisher et al. formula, data was obtained from a minimum sample size of 384 residents at Kiganjo area of Kiambu County. This study adopted a descriptively research design and inferentially using Statistical Package for Social Sciences (SPSS). Analytical findings indicted a significant positive relationship between waste segregation and waste minimization ($r = 0.436$; $p < 0.01$). Major types of wastes segregated were organic waste (25.1%), glass (23.1%), plastics (22.4%), paper and cardboard (18%), and metal (11.5%). The most cited motivation was awareness of environmental impact, reported by 27.8% of the participants while community pressure or social norms (14.2%) had the least impacts implying that peer influence is not a major driver in this area. There was a significance positive relationship between waste recycling and waste minimization ($r=0.695$; $p<0.01$). Major types of recycled waste were paper (28.5%), plastics (20.4 %), glass (17.9%), metal (17.2%) and clothing or textiles at 16.1%. The leading motivation was the economic savings (e.g. selling recyclables), accounting for 31.3% of the responses and social or community responsibility (8.6%) were the least. There was a positive relationship between proper housekeeping and waste minimization ($r=0.281$; $p<0.01$). However, majority of the respondents (73.7%) reported that they do not reuse materials from proper housekeeping while only (26.3%) indicated that they do. The study concluded that waste minimization practices were influenced by awareness of environmental impact, local government initiatives and campaigns, availability of waste segregation bins, community pressure or social norms and personal habits or preferences. The study recommended provision of bins for public use, creation of public awareness on the importance and method of waste separation, establishment of community recycling stations and linking them to waste collectors and processors.

CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

Domestic waste includes both biodegradable components, such as food leftovers, kitchen and garden refuse, and non-biodegradable items like plastics, glass, metals, and packaging materials. The composition of such waste depends largely on household consumption patterns and income levels (Njogu et al. 2018).

For instance, the outbreak of pneumonic plague in Surat, India, was attributed to local authorities' failure to manage household garbage properly (Priya & Kumar, 2003). Studies have shown that effective waste management depends on structured systems. In India, policies require households to segregate waste using color-coded bins, followed by collection, transport, and treatment before disposal. Treatment methods include incineration, shredding, and autoclaving (Rajesh et al., 2018). Similar studies recommend waste minimization through practices such as segregation at the source, reuse, recycling, and improved housekeeping (Rao & Prabhakar, 2013). Other scholars highlight additional strategies such as technological innovation, recovery of by-products, and adopting cleaner production methods (Vigneswaran et al., 1999; Babu et al., 2009).

Waste segregation, separating different types of waste before disposal, plays a central role in effective waste management (Ibna et al., 2021). This practice is shaped by factors like household income, government involvement, housing type, and the age of the household head (Pallegedara et al., 2022). For example, a study in Malaysia found strong links between locality, age, housing type, and waste segregation practices (Sharifah et al., 2022). However, in most developing countries, segregation is rarely practiced at the household level, making it difficult for municipalities to collect sorted waste (Saja et al., 2021). Research in Dar es Salaam showed that poor awareness, weak enforcement of regulations, lack of incentives, and limited prioritization hindered segregation (Jacob et al., 2021).

Recycling is another important waste management approach. It involves transforming discarded materials into new products, thereby reducing reliance on raw resources (Villalba, 2020). Reuse,

on the other hand, refers to using items again in their original form or for alternative purposes (Villalba, 2020). Studies in Tanzania revealed that recycling and reuse of plastics, electronics, and metals were often practiced informally, with waste moving from households to collectors, recycling centers, and industries. However, the process was hindered by inadequate facilities and lack of supportive policies (Kris et al., 2021). In Nairobi, recycling is largely informal, involving unregistered waste pickers and traders who sell to licensed recyclers in bulk (Baud et al., 2004).

Housekeeping practices, defined as maintaining a clean, safe, and environmentally friendly environment, are also crucial for waste minimization (Raghubalan, 2015). Studies in healthcare institutions have shown that structured training improved the ability of housekeeping staff to handle biomedical waste safely, reducing risks of infection and improving disposal methods (Japamani et al., 2023; Shruti et al., 2022).

In many developing countries, poor solid waste management continues to pose risks due to limited awareness, lack of resources, insufficient disposal sites, and slow adoption of modern technologies (Muchangos et al., 2014). Despite governments spending large portions of their revenue on waste management, challenges such as illegal dumping and uncollected waste persist, leading to foul odors, blocked drainage, public nuisance, and insect breeding (Choe & Fraser, 1999; Sharma et al., 2007). Waste minimization not only protects the environment but also promotes health and sustainability. For example, higher education levels have been linked to increased recycling participation, while income levels influence waste generation patterns (Addis & Belay, 2024; Vasanth & Babu, 2024). In Kiganjo, most households rely on plastic bins for storage and later deposit waste at central collection points, where the county collects it weekly. At dumpsites, scavengers informally separate waste for resale. This system reflects the urgent need for improved waste minimization strategies in the area.

1.2 Statement of the Problem

The spread of solid waste everywhere has a clear negative impact on human health and the environment due to its dangerous effects. Hazardous impacts on human health, society, and the economy have been reported, so a large number of researchers are interested in studying how to

collect, sort, recycle and manage them to reduce environmental pollution as much as possible (Hadi et al. 2021). In recent decades, many developing and emerging countries have been dealing with massive population and economic growth. Such rapid development is also associated with an immense increase in solid waste (Ahangar et al., 2021; Fei et al., 2016; Patwa et al., 2021). Despite the existence of laws and policies to regulate and guide waste management, weak implementation and poor practices have led to towns and cities being overwhelmed by their own waste, therefore affecting public health and the environment (Buenrostro et al., 2001). Lack of sorting waste, poor infrastructure and lack of legal enforcement continues to be a challenge (Maton et al., 2016). It is at this backdrop that this study focused on investigating solid waste minimization practices in Kiganjo area of Kiambu County, Kenya. The key factors of study were waste segregation, waste recycling, and proper housekeeping. Further, the study assessed whether solid waste minimization was influenced by education level of the household head and household income level.

1.3 Purpose of the Study

The study investigated solid waste minimization practices in Kiganjo, Kiambu County.

1.4 Conceptual Framework

Figure 1 was the conceptual framework used in this study. The independent variable was made up of three factors: waste segregation, waste recycling, and proper housekeeping. These factors influenced solid waste minimization either directly or through the intervening variable of education level of the household head and household income level. The dependent variable was solid waste minimization.

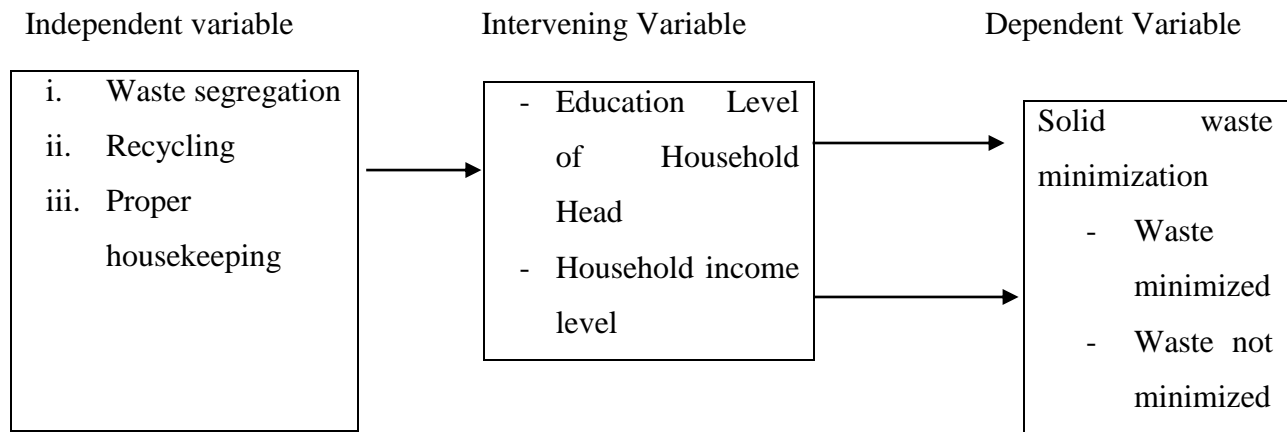


Figure 1 Conceptual Framework

1.5 Research Questions

1. How does waste segregation influence solid waste minimization in Kiganjo?
2. How does waste recycling influence solid waste minimization in Kiganjo?
3. How does proper housekeeping influence solid waste minimization in Kiganjo?

1.6 Research Objectives

1.6.1 General Objectives

To establish measures used to minimize solid waste in Kiganjo, Kiambu County, Kenya.

1.6.2 Specific Objectives

1. To find out the influence of waste segregation on solid waste minimization in Kiganjo.
2. To determine the influence of waste recycling on solid waste minimization in Kiganjo.
3. To establish the influence of proper housekeeping on solid waste minimization in Kiganjo.

1.7 Hypothesis of the Study

1. There is no significant relationship between waste segregation and solid waste minimization in Kiganjo Area.
2. There is no significant relationship between waste recycling and solid waste minimization in Kiganjo Area.
3. There is no significant relationship between proper housekeeping and solid waste minimization in Kiganjo Area.

1.8 Significance of the Study

Most studies on solid waste management have focused on famous settlement areas in Kenya. The study sought to identify gaps in solid waste minimization in Kiganjo. The research is significant because it helps in improving health, conserving resources, creating employment opportunities for the waste collectors and also helps in fighting climate change hence, helps us build a cleaner healthier and more sustainable world. The finding from this location will help understand waste minimization trends in other urban areas.

1.9 Scope of the Study

The research was limited within Kiganjo area in Thika, Kiambu County, due to its diverse demographic composition and observable waste minimization practices and challenges. The study focused on assessing waste minimization practices in Kiganjo, specifically examining the roles of waste recycling, waste segregation and proper housekeeping. The study investigated how these practices were influenced by various social economic factors, particularly the education level of the household head and household income. These factors were chosen for their significant influence on waste minimization practices.

1.10 Limitation of the Study

Participants provided answers that they believed are expected rather than their true practices, leading to biased data. This was avoided by explaining to them the essence of their responses towards achievement of the study objectives and ensuring anonymity and confidentiality of responses.

Gaining access to household was challenging due to factors like unavailability of household head or reluctance to participate in the study. This was avoided by working with local leaders or community groups to build trust and facilitate access to households.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter entails reviewed literature of practices that minimizes solid waste and the level of education of the head and the family's income level as the intervening factors in Kiganjo. The research dwells in segregation behavior, recycling, and housekeeping as the methods of minimizing solid waste generated.

2.1 Influence of Waste Segregation on Solid Waste Minimization in Kiganjo

Waste segregation refers to sorting waste into categories based on how it will be handled or treated (Ibna et al., 2021). A survey in Sri Lanka established that segregation behaviors are influenced by household income, the role of local authorities, age of the household head, and housing type (Pallegedara et al., 2022). Similarly, research in Malaysia reported that household characteristics such as location and dwelling type significantly determined segregation practices (Sharifah et al., 2022). Although separating waste at the source can reduce costs and improve collection efficiency, it is not widely practiced in many developing nations due to limited awareness and inadequate infrastructure (Abdel-Shafy & Mansour, 2018; Saja et al., 2021). In Dar es Salaam, Tanzania, segregation was hindered by lack of incentives, weak enforcement, and insufficient planning (Jacob et al., 2021).

For instance, in Kisii, Kenya, separating household waste has been recommended as a strategy for producing compost manure and energy, with potential income benefits (Jacob, 2018). Research in Ghana also confirmed that households practicing segregation alongside recycling significantly reduced pollution (Prince & Abena, 2022).

2.2 Influence of Waste Recycling on Solid Waste Minimization in Kiganjo

In Tanzania, research found that households engage in informal recycling of plastics, metals, and electronics, with materials moving from households to waste pickers, then to recycling centers and industries. This process, however, is constrained by lack of facilities and weak policy support (Kris et al., 2021). In Nairobi, informal recycling is facilitated by licensed waste dealers who buy from small-scale collectors and resell to large recyclers (Baud et al., 2004). Globally, recycling of plastics has expanded significantly. For example, Dinger (2000) notes that post-consumer plastic recycling has supported the creation of new products such as toys, detergent bottles, and disposable cameras. Such initiatives contribute to resource conservation and economic savings. Scholars argue that among waste management options, reuse and recycling are

preferable because they conserve resources and provide social and economic benefits (Troschinetz & Mihelcic, 2009; Louppe, 2006). In Ghana, a study concluded that combining segregation and recycling helps reduce household waste pollution (Prince & Abena, 2022).

2.3 Influence of Proper Housekeeping on Solid Waste Minimization in Kiganjo

Housekeeping can be understood as maintaining a clean, safe, and environmentally friendly living or working space (Raghubalan, 2015). In educational institutions, students have been reported to play a key role in maintaining hygiene through regular cleaning and proper waste control (Frimpong, 2020).

In healthcare settings, housekeeping employees often have inadequate knowledge of waste handling. However, structured training programs have been shown to improve their practices and enhance safety (Japamani et al., 2023). Similarly, Shruti et al. (2022) found that experience and repeated training improved biomedical waste handling among staff. In the household context, regular cleaning and waste separation are essential components of good housekeeping, which in turn supports waste minimization (Zarifah et al., 2017; Rao & Prabhakar, 2013). Frequent cleaning and proper organization encourage consistent sorting of waste and reduce accumulation of refuse.

2.4 Influence of Education Level of the Household Head on Solid Waste Minimization in Kiganjo

Research has shown that education influences waste management practices. For instance, Addis and Belay (2024) observed that households headed by individuals with college-level education or higher were more likely to use formal disposal methods, such as door-to-door collection, rather than open dumping. Education also promotes awareness of sustainable practices, leading to higher rates of recycling (Rada et al., 2016; Vasanth & Babu, 2024). Households with better-educated members are more likely to reduce waste and adopt environmentally responsible behaviors (Handayani et al., 2019). Therefore, education serves as both an enabler of sustainable practices and a driver of community awareness campaigns on waste minimization.

2.5 Influence of Household Income on Solid Waste Minimization in Kiganjo

Household income has a direct effect on waste generation and minimization practices. Some studies suggest that higher-income households produce more waste due to increased consumption, but they also have greater access to waste reduction facilities (Addis et al., 2024). Conversely, lower-income households may generate less waste but often rely on open dumping

or single-use items due to limited resources (Ashutosh et al., 2024). In Bengkalis, Indonesia, income levels were found to significantly affect the effectiveness of waste minimization, with wealthier households more capable of adopting formal practices such as recycling (Siregar & Putra, 2023). Overall, income shapes both the quantity of waste produced and the methods available for its management.

2.6 Theoretical Framework

There is a lack of guidance in choosing an appropriate theory for a particular purpose, such as intervening the behavioral patterns of solid waste minimization. Earlier studies have highlighted that theories may be applied to environmental and behavior change interventions, which generally emphasized individual and interpersonal relationships within society and environment. Moreover, these theories often concluded that interventions are more effective when variables are targeted at different levels (Davis et al, 2019).

This study was guided by several theories that explained waste management behavior. The Waste Hierarchy Theory prioritized reduction and reuse as the most sustainable options, followed by recycling, recovery, and disposal (EPA, 2022). The Circular Economy model extended this idea by promoting product lifecycle management and resource recovery as part of a closed-loop system (Stiftung, 2024). Additionally, the Community Empowerment Theory emphasized active participation of residents, community groups, and local authorities in sustainable practices. According to Nike et al. (2020), involving communities enhances the adoption of waste minimization behaviors by fostering ownership and responsibility.

2.7 Summary of Identified Gaps in the Reviewed Literature

The above theories only identified waste minimization practices was reduction and reuse which were more environmentally beneficial than recycling or disposal, also for designing systems that minimized waste generation through product lifecycle management. The gaps identified were; majoring on reuse and leaving out recycling which was also a practice that could be employed in waste minimization. Also, we identified that waste segregation at the source and proper housekeeping practices helped in solid waste minimization.

CHAPTER THREE: RESEARCH METHODS

3.0 Introduction

This chapter entails the research design, study area, target population, sampling techniques, sample size, measurements of variables, data collection tools, validity of measurements, reliability of measurements, data collection techniques, data analysis and logistical and ethical considerations.

3.1 Research Design

This study adopted a descriptive correlation research design to investigate household waste minimization practices in Kiganjo, Thika Sub-County. The choice of this design was guided by the objectives of the study, which aimed to explore current practices such as waste segregation, recycling and housekeeping behaviors, and to determine the influence on overall waste minimization. The descriptive components were used to provide a clear picture of the existing behaviors and characteristics of respondents regarding solid waste minimization. It enabled us to collect detailed quantitative data on how households engage in various waste practices and to summarize these findings using frequencies, percentages and graphical presentations. The design was appropriate for the following reasons:

- a. It allowed the collection of data from a large population through questionnaires.
- b. It enabled the identification of patterns and relationships among variables.
- c. It supported the use of both descriptive statistics and inferential techniques such as cross tabulation and Kendall's tau_b correlation.

3.5 Sample Size

The desired sample size was determined using the Fisher et al formula (1983).

$$n = \frac{z^2 \cdot p \cdot (1-p)}{d^2}$$

Where

n = Required Sample size

Z = 95 % confidence interval for normal standard deviation (1.96).

p = Proportion of the target population that possesses the desired characteristic

d = Desired margin error (0.05)

$$n = \frac{1.96^2 \cdot 0.5 \cdot (1-0.5)}{0.05^2} = 384.16 \approx 384$$

n= 384 residents

3.6 Measurements of Variables

Variable	Measures/Indicators	Measurement scale	Question number
Solid waste minimization	-solid waste minimized -solid waste not minimized	Nominal scale	
Segregation practices	- waste segregated i. food stuff ii. plastics iii. metals - waste not segregated	Nominal scale	SECTION 2
Recycling	-waste recycled i. types of recycled waste -waste not recycled i. types of unrecycled waste	Nominal scale	SECTION 3
Proper housekeeping	- Dustbins present - Dustbins absent - General house hygiene	Nominal scale	SECTION 4

Table 1 measurement of variables

3.7 Data Collection Tools

Interview was used to gather information on ways of minimizing solid waste, the role of local government authorities in solid waste minimization and challenges faced during the minimization practices in Kiganjo. This was helpful to understand ways of solid waste minimization, the role of local government authorities in waste minimization and the challenges faced during minimization of solid waste.

Observation was used to gather information on how solid waste is disposed in Kiganjo. This information helped us to know how the waste is disposed in the area.

3.8 Validity of Measurements

To ensure validity of measurements in assessing solid waste minimization among the residents of Kiganjo, this study employed various strategies. Content validity was achieved by designing survey question that comprehensively cover aspects of proper housekeeping practices,

segregation practices and the recycling behaviors. To ensure construct validity, questions were formulated to accurately reflect resident's attitude, practices and knowledge about solid waste minimization.

3.9 Reliability of Measurements

To ensure that the tools we used for this study on solid waste minimization in Kiganjo give consistent results, we checked consistency overtime by giving the survey twice to a small group of people and seeing if the answers were similar. We also checked if the questions in the survey have consistent answers.

CHAPTER FOUR: FINDINGS AND DATA PRESENTATION

4.1 Demographic Information

Frequencies were run to show the distribution of respondents according to their demographic characteristics. Findings were as shown in Table 2.

Table 2 Demographic information of the respondents

Variable	Frequency	Percent
Gender		
Male	180	46.87
Female	204	53.13
Highest level of education		
No education	19	4.95
Primary education	98	25.52
Secondary education	158	41.15
Tertiary education	109	28.39
Family average monthly income		
Below Ksh 10,000	58	15.10
Ksh 10,001-20,000	82	21.35
Ksh 20,001-30,000	82	21.35
Ksh 30,001-50,000	97	25.26
Above Ksh 50,000	65	16.93
Respondent's age group		
Below 18	42	10.94
18-30	144	37.50
31-45	111	28.91
46-60	67	17.45
60+	20	5.21
TOTAL	384	100

In terms of income 25.26% of the respondents earned between KSH 30,001 and 50,000, while 21.35% fell in each of the two brackets: KSH 10,001-20,000 and KSH 20,001-30,000.

Respondents earning above KSH 50,000 (16.93%) while those earning below KSH 10,000 (15.10%). The largest age group among the respondents was 18-30 years (37.50%), followed by 31-45 years (28.91%) and 46-60 years (17.45%). Those below 18 accounted 10.94% and only 5.21% of the respondents were aged 60+.

4.2 Influence of Waste Segregation on Waste Minimization

4.2.1 Descriptive Analysis

Frequencies were run to establish the presence of waste segregation at Kiganjo area of Thika. Findings were as shown in Figure 2.

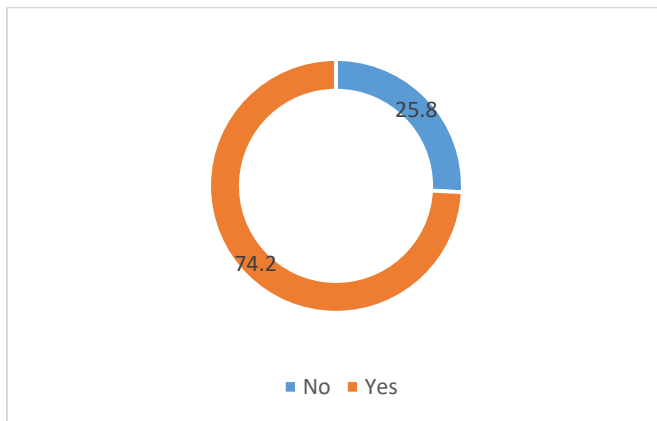


Figure 2 A doughnut showing the presence of waste segregation at Kiganjo

Findings in Figure 2 showed that majority (about 74.2%) of the respondents practiced waste segregation as a measure of waste minimization. This is inconsistent with findings of a study by Saja et al. (2021). For those who segregated waste, cross tabulation analysis was done to bring out the frequency of waste segregation behavior as a measure of waste minimization. Results were as presented in Table 3.

Table 3 Results of cross-tabulation analysis showing waste segregation behavior in Kiganjo

Waste segregation frequency		
Rarely	Sometimes	Always
23.02	39.21	37.77
Chi-square = 218.069; p-value =0.000		
Linear-by-Linear Association = 102.106; p-value =0.000		

Findings in Table 3 showed that majority of the residents indicated that they segregated waste sometimes (39.21%), followed by those that segregated always (37.77%) with the least respondents reporting that they rarely segregated their waste (23.02%). The study noted that waste segregation was a significant measure towards waste minimization, at a chi-square value of 218.069 and p-value of 0.000.

4.2.2 Correlation Analysis

Kendall’s tau_b correlation analysis was done to show the relationship between waste segregation and waste minimization at Kiganjo, Thika. The results were as indicated in Table 4.

Table 4 Results of correlation analysis showing the relationship between waste segregation and waste minimization

		Waste segregation	Waste minimization
Waste segregation	R	1	.436**
	P	.	0
Waste minimization	R	.436**	1
	P	0	.

**p < 0.01

The findings in Table 4 showed a significant positive relationship between waste segregation and waste minimization (r=0.436, p <0.01). This indicated that households that actively practiced waste segregation was more likely to achieve waste minimization in Kiganjo. This is consistent with the findings of a study by Ajayi et al. (2017) and that of Prince and Abena (2022). The positive nature of the correlation suggested that improved segregation effort contributed to better waste minimization.

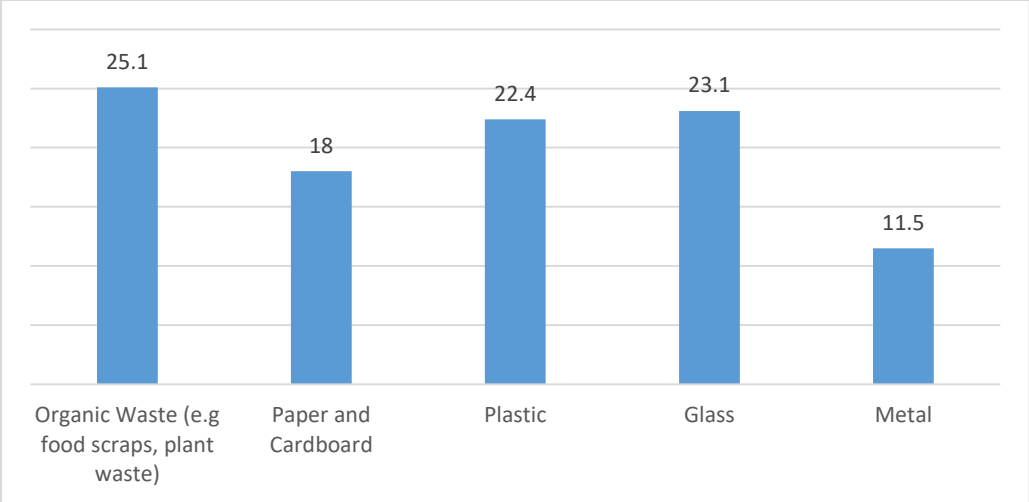


Figure 3 Bar Graph showing types of waste segregated

Figure 3 represented a bar graph of types of waste segregated in Kiganjo. According to the bar graph majority of the respondents segregated organic waste (25.1%), followed by glass (23.1%) then plastics (22.4%) followed by paper and cardboard (18%) and the least segregated was metal (11.5%)

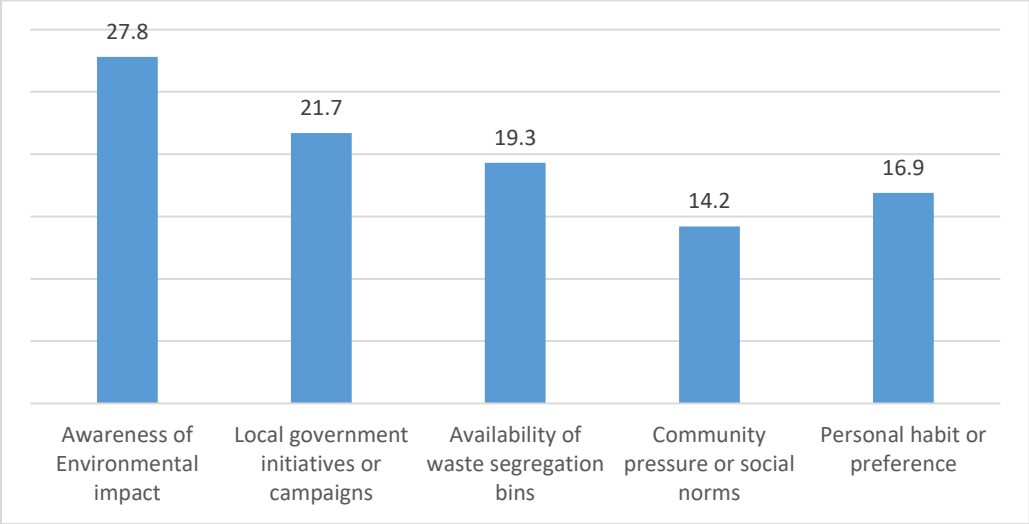


Figure 4 Bar graph showing waste segregation factors

Figure 4 presented the various factors that motivated respondent to practice waste segregation. The most cited motivation was awareness of environmental impact, reported by 27.8 percent of the participants. This suggest that a significant portion of the population is conscious of the environmental benefits of waste minimization. Another notable motivator included local government initiatives or campaigns (21.7%) and the availability of waste segregation bins

(19.3%), showing that external support systems also influence waste segregation behavior. Community pressure or social norms (14.2%) had the least impacts implying that peer influence is not a major driver in this area. Meanwhile, personal habits or preferences accounted for (16.9%) highlighting that some residents have adopted segregation as part of their routine behavior.

4.3 Influence of Waste Recycle on Waste Minimization

4.3.1 Descriptive Analysis

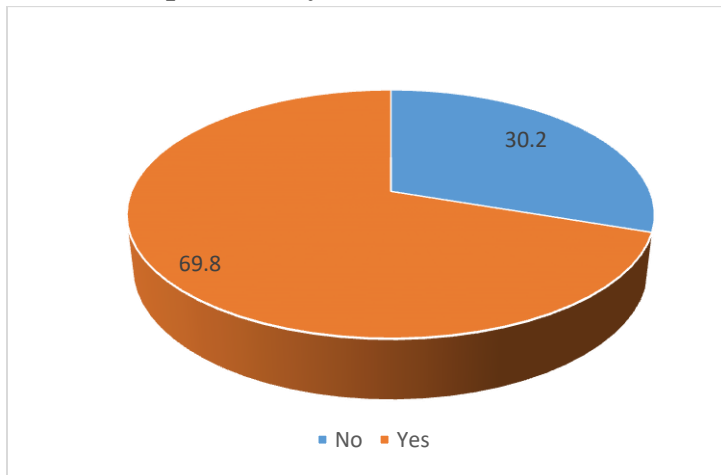


Figure 5 A pie chart showing recycling participation

Figure 5 presented a pie chart illustrating the level of recycling participation among respondents. The results indicated that 69.8 percent of the participants reported that they actively recycled waste, while 30.2 percent of the participants reported not engaging in any form of recycling. This suggest that a significant majority of the population participate in waste recycling. As appreciated by Baud et al. (2004), some respondents practiced waste recycling as a source of employment.

4.3.2 Cross-tabulation analysis

Cross tabulation analysis was done to bring out the relationship between waste recycle behavior and how often it is carried out. Results were as presented in Table 5.

Table 5 Result of cross tabulation analysis showing the relationship between wastes recycle behavior and how often it is carried out

Waste recycling frequency		
Rarely	Sometimes	Always
23.02	43.77	33.21
chi-square=328.082;p-value=0.000		
Linear- by-Linear Association=231.094; p-value=0.000		

Findings in Table 5 showed that majority of the residents indicated that they recycled waste sometimes (43.77%), followed by those that recycled always (33.21%) with the least respondents reporting that they rarely recycled their waste (23.02%). The study noted that waste recycling was a significant measure towards waste minimization, at a chi-square value of 328.082 and p-value of 0.000.

4.3.3 Correlation Analysis

Kendall’s tau_b correlation analysis was done to show the relationship between waste recycling and waste minimization at Kiganjo, Thika. The results were as indicated in Table 6

Table 6 Results of correlation analysis showing the relationship between waste recycling and waste minimization

			Waste
		Waste Recycle	Minimization
Waste Recycle	r	1	.695**
	p	.	0
Waste Minimization	R	.695**	1
	P	0	.

**p < 0.01

The findings in table 6 showed the correlation between waste recycling and waste minimization is r=0.695 with a significant level of p < 0.01. This reflects a strong positive correlation meaning that respondents who engage in waste recycling are significantly more likely to minimize their household waste. Aligned with the results of a study done by Rao and Prabhakar (2013) and a study done by Zarifah et al. (2017), recycling was a method of waste minimization.

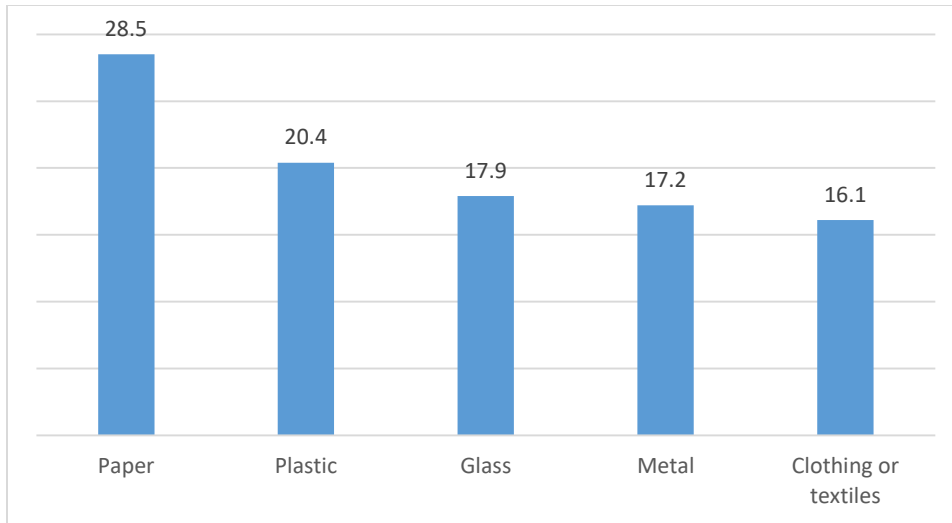


Figure 6 A bar graph showing types of waste recycled

Figure 6 illustrated the distribution of different types of waste materials recycled by respondents. Paper was the most recycled material with 28.5% of the responds indicating participation in its recycling. This was followed by plastics (20.4 %), glass (17.9%), metal (17.2%) and clothing or textiles at 16.1%. These results suggest that paper and plastics are the most recycled possibly due to their high usage and ease of collection.

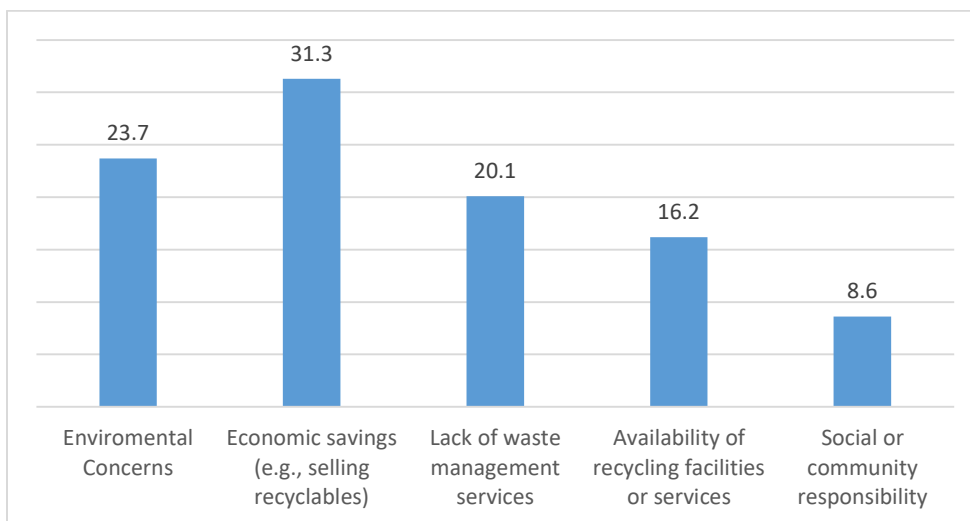


Figure 7 A bar graph showing motivations influencing recycling behavior

Figure 7 presented various motivations that influence recycling behavior among the residents of Kiganjo. The leading motivation was the economic savings (e.g. selling recyclables), accounting for 31.3% of the responses. Environmental concerns followed closely at 23.7%, indicating that a significant portion of the population recycles out of a desire to protect the environment. Lack of

waste management services (20.1%), availability of recycling facilities or services (16.2%) and social or community responsibility (8.6%) were the least.

4.4 Influence of Proper Housekeeping Practices on Waste Minimization

4.4.1 Descriptive Analysis

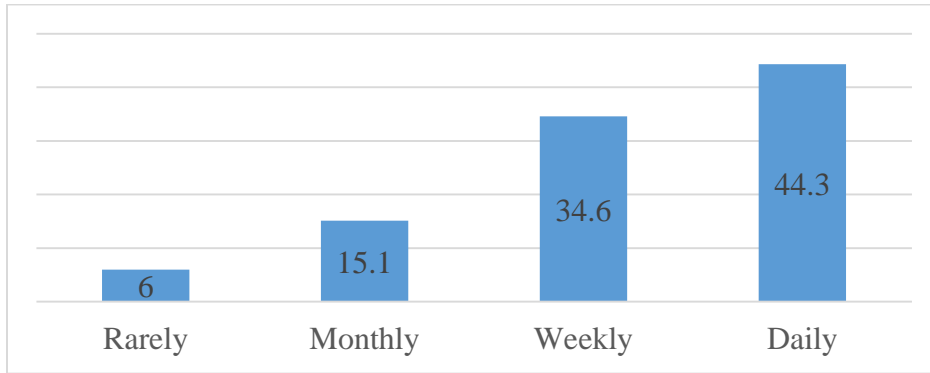


Figure 8 a bar graph showing frequency of housekeeping practices

Figure 8 presented the bar graph showing how often the respondents engage in housekeeping practices. The majority reported cleaning their homes daily (44.3%), followed by weekly (34.6%) then monthly (15.1%). The least were those who cleaned rarely (6%). As appreciated by Jones and Pizam (2008) housekeeping consists of the simpler aspect of building care and maintenance.

4.4.2 Cross-Tabulation Analysis

Cross tabulation analysis was done to bring out the relationship between sorting of waste into categories and how often spaces are cleaned and organized. Results were as presented in Table 7. Table 7 Results of cross tabulation analysis showing the relationship between sorting of waste and space cleaning

		Sorting waste		
		No	Yes, Sometimes	Yes, Always
Cleaning	Rarely	52.17	39.13	8.70
	Monthly	15.52	63.79	20.69
	Weekly	18.05	54.89	27.07
	Daily	12.35	33.53	54.12
Chi-square=57.318;p-value=0.000				
Linear-by-Linear Association=36.113;p-value=0.000				

Table 7 showed a cross tabulation analysis indicating a clear relationship between how often people clean their spaces and whether they sort their waste. Majority (52.17%) of those who rarely cleaned their spaces did not sort their waste, while only a small proportion (8.70%) sorted their waste always. The frequency of cleaning was directly associated with the likelihood of sorting waste always. For instance, about 8.70% of those who cleaned rarely sorted their waste always whereas 54.12% who cleaned daily sorted their waste. Much as the findings of the study done by Zarifah, Salniza and Izah (2017) household waste separation, which is one of the good housekeeping techniques, is a means of waste minimization

The chi-square value of 57.318 and a p-value of 0.000 indicates that the relationship between cleaning frequency and waste sorting is statistically significant. The Linear-by-Linear Association value of 36.113 with a p-value of 0.000 confirms a strong positive trend. As cleaning becomes more frequent, so does the consistent practice of waste sorting. This suggest that promoting regularly cleaning habits may improve responsible waste minimization.

4.4.3 Correlation Analysis

Kendall's tau_b correlation analysis was done to show the relationship between proper housekeeping practices and waste minimization at Kiganjo, Thika. The results were as indicated in Table 8

Table 8 Results of correlation analysis showing the relationship between proper housekeeping practices and waste minimization

		Proper housekeeping	Waste Minimization
Proper housekeeping	r	1	.281**
	p	.	0
Waste Minimization	r	.281**	1
	p	0	.

**p < 0.01

The findings in table 8 showed the correlation between proper housekeeping and waste minimization is $r=0.281$ with a significant level of $p < 0.01$. This reflects a strong positive correlation meaning that respondents who engage in proper housekeeping are significantly more

likely to minimize their household waste. In line with a study done by Rao and Prabhakar (2013) proper housekeeping was a method of waste minimization.

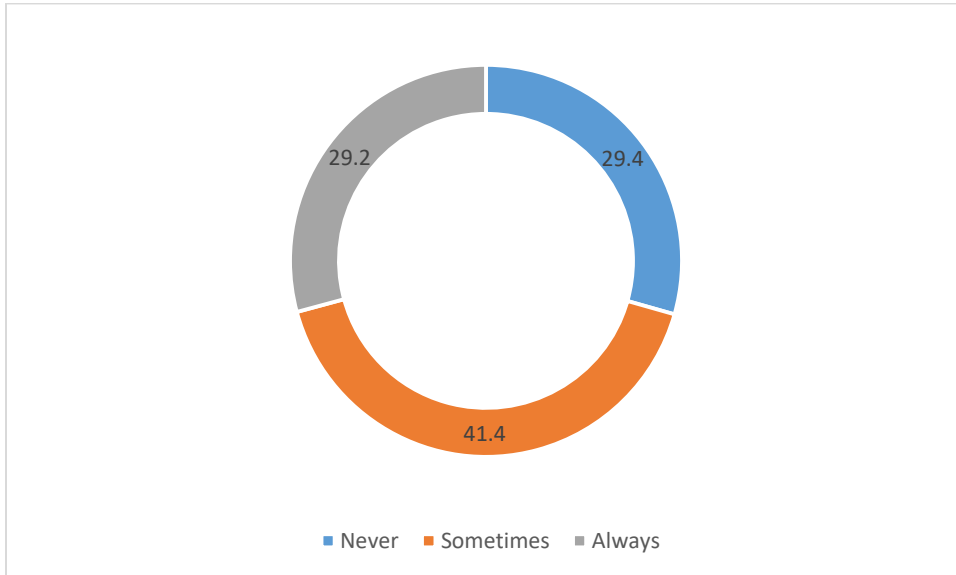


Figure 9 Doughnut of frequency of composting organic waste

Figure 9 illustrates a doughnut presenting frequency of composting organic waste. A significant portion reported composting sometimes (41.4%), while 29.4% indicated that they never composted. Meanwhile 29.2% indicated that they always compost organic waste.

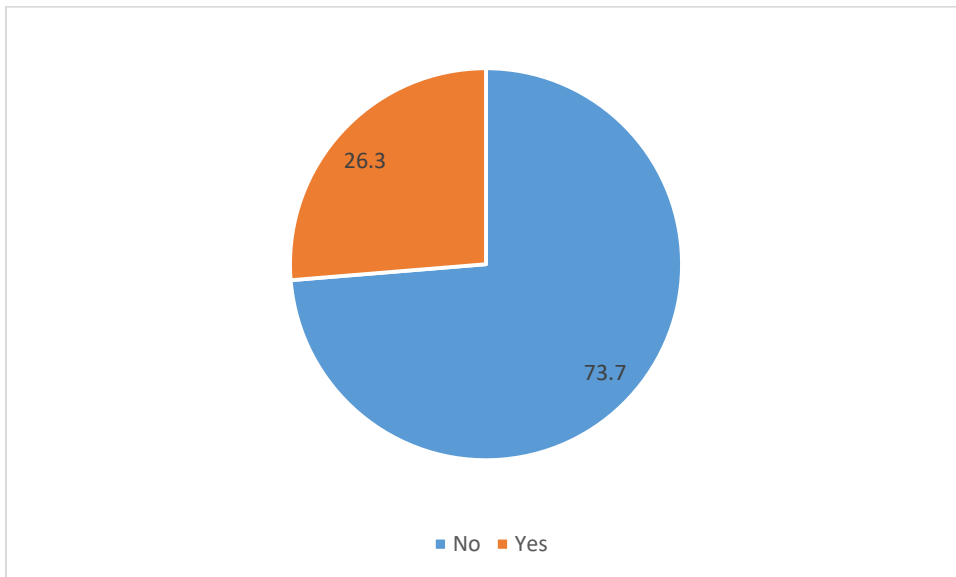


Figure 10 Pie-chart of response on reuse

Figure 10 presented a pie chart of responses on whether respondents reuse waste materials generated from proper housekeeping. Majority of the respondents (73.7%) reported that they do not reuse such materials while only (26.3%) indicated that they do.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This study set out to examine the role of waste segregation, recycling and proper housekeeping in effective waste minimization. Data was collected through questionnaires, interviews and observation among households, institutions, and waste handlers.

5.1 Key Findings

This study investigated waste minimization practices in Kiganjo, in response to the growing environmental and health concerns associated with solid waste management. Guided by Fisher et al. formula, data was obtained from a minimum sample size of 384 residents at Kiganjo area of Kiambu County. This study adopted a descriptively research design and inferentially using Statistical Package for Social Sciences (SPSS). Analyzed data was presented using graphs, tables and texts. The Theoretical Framework integrated the Waste Hierarchy Theory and Circular Economy Theory. The data collection tools used were questionnaires, interviews and observation.

5.1.1 Influence of Waste Segregation on Waste Minimization

Most respondents had knowledge on waste segregation since they recorded that they segregated their waste at the source though majority did it sometimes (39.21%), always (37.77%) then rarely (23.02%). The study noted that waste segregation was a significant measure towards waste minimization, at a chi-square value of 218.069 and p-value of 0.000. The most segregated type of waste was inorganic waste and the key driving factor to waste segregation was awareness of environmental impact. However, challenges such as lack of knowledge or awareness, lack of proper waste segregation facilities, waste management systems in the area do not support segregation, inconvenience while others said that they do not believe in waste segregation hindering the practice of waste segregation.

5.1.2 Influence of waste recycling on waste minimization

Waste recycling in the area was practiced by most of the respondents. Majority of the residents indicated that they recycled waste sometimes (43.77%), followed by those that recycled always (33.21%) with the least respondents reporting that they rarely recycled their waste (23.02%). The study noted that waste recycling was a significant measure towards waste minimization, at a chi-square value of 328.082 and p-value of 0.000.

Materials commonly recycled were paper while the least were clothing or textiles. The major driving factor to waste recycling was economic saving. However, challenges such as lack of information or knowledge, lack of recycling facilities, inconvenience while others didn't see the need to recycle hindering waste recycling in the area. Informal recycling by waste pickers was significant, but unrecognized or unsupported by local authorities.

5.1.3 Influence of proper housekeeping on waste minimization

Proper housekeeping contributed significantly to reduced waste accumulation leading to waste minimization in the area. Majority (52.17%) of those who rarely cleaned their spaces did not sort their waste, while only a small proportion (8.70%) sorted their waste always. The frequency of cleaning was directly associated with the likelihood of sorting waste always. For instance, about 8.70% of those who cleaned rarely sorted their waste always whereas 54.12% who cleaned daily sorted their waste. The chi-square value of 57.318 and a p-value of 0.000 indicates that the relationship between cleaning frequency and waste sorting is statistically significant. The Linear-by-Linear Association value of 36.113 with a p-value of 0.000 confirms a strong positive trend. Households that practiced daily cleaning, composting organic waste, and reusing materials had lower waste output.

5.2 Conclusion

The study concludes that segregation, proper housekeeping, and recycling are interlinked pillars of effective waste minimization. Despite a general awareness of these practices, implementation remains low due to inadequate facilities, limited knowledge, and weak enforcement. Households that integrated these practices reported cleaner environments, reduced waste volumes, and improved health outcomes. Therefore, there is a strong case for promoting education, infrastructure investment, and policy enforcement to enhance sustainable waste management.

5.3 Recommendations

Based on the findings, the following recommendations are made:

Provide color-coded and labelled bins for public use. Conduct awareness campaigns to educate the public on the importance and method of waste separation. Establish community recycling stations and link them to waste collectors and processors. Partner with private sector players to create a market for recyclable materials. Recognize and support informal recyclers by integrating them into formal waste management systems.

Train household members and workers on standard housekeeping routines. Encourage composting of organic waste at the household level. Ensure regular waste collection to discourage dumping and cluttering.

5.4 Suggestions for Further Research

Future researchers may consider: Investigating the impact of school-based waste education programs on community waste habits. Assessing the economic benefits of household-level recycling. Evaluating the role of local government policies in supporting waste segregation and recycling.

Questionnaire

Section 1: Demographic Information

1. What is your age group?

- Below 18
- 18 - 30
- 31 - 45
- 46 - 60
- 60+

2. What is your sex?

- Male
- Female
- Intersex

3. What is your highest level of education?

- No formal education
- Primary education
- Secondary education
- Tertiary education

4. What is your family's average monthly income?

- Below KSH 10,000
- KSH 10,000 - 20,000
- KSH 20,001 - 30,000

KSH 30,001 - 50,000

Above KSH 50,000

Section 2: The influence of waste segregation on solid waste minimization in Kiganjo

1. Do you segregate your waste at home?

No

Yes

2. If yes, which types of waste do you segregate? (Select all that apply)

Organic waste (e.g., food scraps, plant waste)

Paper and cardboard

Plastic

Glass

Metal

Other (please specify): _____

3. How often do you segregate waste at home?

Never

Rarely

Sometimes

Always

4. What motivates you to segregate waste? (Select all that apply)

Awareness of environmental impact

Local government initiatives or campaigns

- Availability of waste segregation bins
- Community pressure or social norms
- Personal habit or preference
- Other (please specify): _____

5. If you do not segregate waste, what are the main reasons? (Select all that apply)

- Lack of knowledge or awareness
- Lack of proper waste segregation facilities (e.g., bins)
- Waste management system in my area does not support segregation
- Inconvenience (e.g., extra time and effort)
- I do not believe in waste segregation
- Other (please specify): _____

Section 3: The influence of waste recycling on solid waste minimization in Kiganjo

1. Do you recycle any waste materials?

- No
- Yes

2. If yes, what types of materials do you recycle? (Select all that apply)

- Paper
- Plastic
- Glass
- Metal
- Clothing or textiles
- Other (please specify): _____

3. How often do you recycle waste materials?

- Never
- Rarely
- Sometimes
- Always

4. What motivates you to recycle or waste materials? (Select all that apply)

- Environmental concerns
- Economic savings (e.g., selling recyclables)
- Lack of waste management services
- Availability of recycling facilities or services
- Social or community responsibility
- Other (please specify): _____

5. If you do not recycle, what are the main reasons? (Select all that apply)

- Lack of information or knowledge
- Lack of recycling facilities
- Inconvenience
- I don't see the need to recycle
- Other (please specify): _____

Section 4: The influence proper housekeeping on solid waste minimization in Kiganjo

1. Do you have a dustbin?

- No
- Yes

2. How often do you clean and organize spaces like sitting room and kitchen?

- Rarely
- Monthly
- Weekly
- Daily

3. Do you regularly sort waste into categories (e.g. recyclable, organic)?

- No
- Yes, Sometimes
- Yes, Always

4. How often do you compost organic waste (food scraps)?

- Never
- Sometimes
- Always

5. a) Do you re-use any materials from proper housekeeping?

- No
- Yes

b) If yes, which ones?

.....

.....

.....

.....

c) If yes in (a) above, how do you reuse them?

.....
.....
.....
.....
.....

6.2 Interview Guiding Questions.

1. What do you understand by solid waste minimization?
2. a) Do the residents of Kiganjo segregate their waste before disposal?
If yes, how do they segregate their waste?
Which possible challenges do they face in segregating their waste?
3. a) Is waste recycling a common practice in Kiganjo?
b) Which are the most recycled wastes?
c) Which are the least recycled wastes?
4. How is proper housekeeping related to waste minimization at Kiganjo?
5. What are some of the reasons why some households do not observe proper housekeeping?
6. What are some of the ways in which solid waste can be minimized?
7. What role does the local government play in waste minimization in Kiganjo?
8. How is waste typically collected, sorted and disposed off?
9. Who is responsible for waste collection and disposal?
10. How often is waste collected at your place?