Types of Solid Waste Generated in Kisumu City

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DOI: https://doi.org/10.51244/IJRSI.2026.1307000418

Received: 10 August 2026; Accepted: 17 August 2026; Published: 22 August 2026

ABSTRACT

This study aimed at determining the types of waste generated in Kisumu City. The research adopted a mixed-methods approach. The study site had a target population of 500,000, and the sample used in the study was 429 respondents. The sample comprised 399 households, 10 recyclers and 20 waste pickers, businesses, industries, waste management officials, and other stakeholders from non-governmental organizations. Quantitative data collected was analyzed using the statistical software for Social Science version 29, while qualitative data from interviews and focus group discussions were coded and analyzed thematically. The analyzed data was presented as tables, charts, and graphs to establish trends and patterns. The results from descriptive statistics indicated that most of the households and the people within, including markets generate solid waste. The study concluded that diverse types of waste are generated in Kisumu City. The study recommended that the city authorities should strengthen waste collection by investing in additional vehicles and personnel, and by implementing reliable, well-communicated collection schedules. The city should implement and promote waste segregation at the source by educating residents on separating biodegradable from non-biodegradable waste. Kisumu City should invest in modern waste management technologies such as waste-to-energy systems, automated collection vehicles, and smart monitoring tools.

Keyword: Solid Waste

INTRODUCTION

Solid waste is discarded or abandoned materials of no value, including urban, agricultural, biomedical, and radioactive waste. Examples may be tires, latex paints, septage, scrap metals, furniture, appliances and vehicles, empty aerosol cans, compressed gas cylinders, construction and demolition debris, and so on (Rafey et al., 2024).

Solid waste generation is a pressing global issue directly tied to population growth, urbanization, industrialization, and changing consumption patterns. Each type of solid waste has distinct sources, impacts, and management challenges. Municipal solid waste is typical household and commercial discards, including plastics, paper, metals, and glass. Annually, some 2.24 billion tonnes of municipal solid trash are produced worldwide, with projections estimating an increase to 3.88 billion tonnes by 2050, attributed to swift urbanization and economic expansion (World Bank, 2018). Plastic trash is a significant global issue as it substantially contributes to environmental damage. Around 400 million tonnes of plastic garbage are produced annually globally, with merely 9% being recycled (UNEP, 2024). Plastics, especially single-use items, persist for centuries in landfills and oceans, harming marine ecosystems and entering the food chain as micro plastics. Electronic trash comprises abandoned electronic gadgets, including phones, laptops, and appliances.

In 2019, the world produced 53.6 million tonnes of e-waste, with an annual growth rate of 3-4% (Global E-Waste Monitor, 2020). Merely 17.4% of e-waste undergoes formal recycling, while the remainder is frequently disposed of in landfills or mishandled, particularly in developing nations. Toxic chemicals such as mercury and lead from electronic waste can permeate soil and water, presenting health hazards. Hazardous waste, often hidden risk waste, comprises toxic, flammable, or reactive materials produced by industry, healthcare facilities, and households. Annually, dangerous global waste production is estimated at 400 million tonnes (Sharma et al., 2021). Industrial garbage produced by manufacturing, construction, and mining

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VII July 2026

constitutes one of the main kinds of solid waste. Construction and debris alone account for about 36% of global solid waste (UNEP,2020). They include concrete, metals, wood, and other materials as developed countries employ recycling programs while developing countries struggle with informal dumping.

Agricultural activities produce substantial waste, including agricultural wastes, animal dung, and industrial by-products. Globally, agrarian waste represents a significant fraction of solid waste, though exact estimates vary (Parsa et al., 2024). Healthcare facilities generate a specific type of waste, including syringes, masks, and pharmaceutical products. The COVID-19 pandemic significantly increased medical waste worldwide, with an estimated 30% rise in waste production in affected regions (WHO, 2020). Improper disposal of medical waste can spread infectious diseases and harm ecosystems.

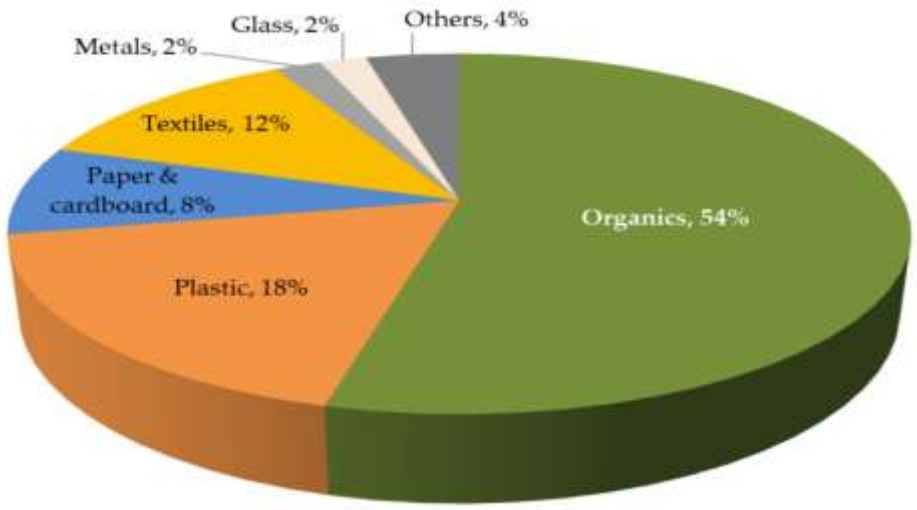

Figure 1.0: Types of solid waste generated in the world

Source: FAO, 2022.

Al-Khatib et al. (2023) performed a study in Nablus City, Palestine, examining the makeup of municipal solid waste. Their study showed that the biggest portion of the waste stream was organic waste, making up around 68%, with recyclables at 27.4% and plastics at 10.1%. The research additionally classified plastic waste into specific polymer categories including LDPE, PET, HDPE, and PP. This detailed classification is especially beneficial for guiding recycling and recovery approaches. Although the circumstances in Nablus differ from those in Kisumu, the significance of organic waste and increasing plastic use illustrates wider consumption trends observed in urban areas throughout the Global South. This study, however, did not explore informal waste recovery or community practices, which are both strongly integrated into Kisumu's waste environment. Consequently, a lack of understanding remains about how culturally and economically rooted behaviors influence the specific types and amounts of waste in Kisumu communities.

Aleisa and Al-Jarallah (2024) analyzed the generation of municipal solid waste in Kuwait by sector, concentrating on residential, commercial, and institutional origins. Their results indicated that organic waste made up 45.3% of the overall solid waste, while paper and plastics accounted for 19.9% and 19.8% respectively. The research highlighted that waste characteristics differ based on land use and socioeconomic elements, a point that aligns with Kisumu's varied land use, ranging from informal settlements to commercial centers and educational institutions. While the research offers a systematic and in-depth comprehension of waste categories, it takes place in an affluent Middle Eastern setting with established collection frameworks and more stringent waste management laws. Kisumu, in contrast, depends significantly on informal methods and insufficient public waste facilities. This underscores a notable research gap concerning how various urban areas in Kisumu differently influence waste composition, particularly when standardized collection and sorting practices are lacking.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VII July 2026

Osaily et al. (2023) conducted research in the West Bank, examining the organic component of municipal solid waste and its potential for energy production. The study revealed that almost 50% of the overall waste consisted of biodegradable organic material, a statistic that aligns with patterns observed in numerous low- and middle-income areas. Although the main goal of the study was energy production, it provided important compositional information by emphasizing the prevalence of food and agricultural waste in the area. This aligns with Kisumu's waste characteristics, in which a significant portion of the waste originates from food markets, residences, and agricultural leftovers. Nonetheless, Osaily's study did not explore the spatial differences in waste categories or the influence of informal markets on waste production. Kisumu's vibrant urban-rural boundary and informal trading system require more detailed, context-related data that encompasses not only waste categories but also their relation to land use and economic factors. This results in a lack of understanding regarding how economic informality and spatial diversity influence the characteristics of solid waste in the city.

Awafo et al. (2023) examined the makeup of household solid waste in Ghana's Techiman Municipality, providing a comprehensive analysis: 66.5% organic waste, 19.2% plastics, 3.3% paper, 3.2% metals, 0.9% glass, 0.6% textiles, with the remainder being inert and various other materials. The research also found a 29% potential for recycling in the overall waste stream, mainly made up of plastics and paper. This is very pertinent for Kisumu, where plastic packaging and food waste largely control visible waste piles. Awafo's research also highlighted the role of the informal sector in waste collection and recovery a complementary system essential to Kisumu's urban ecology. Although Techiman and Kisumu have comparable economic frameworks and waste issues, the study conducted in Ghana did not break down data according to neighborhoods or socioeconomic status. For Kisumu, this highlights a lack of insight into how demographic and economic differences affect the kinds of waste produced and if various areas of the city show distinct waste traits that need customized management approaches.

RESEARCH METHODOLOGY

Study Design

This research utilized a mixed method research design which combines quantitative and qualitative data collection methods to comprehensively understand the multifaceted effects of Kisumu City in Solid Waste Management. A mixed approach allowed for a deeper exploration of the complex interactions between Innovative Techniques that may be implored to solve Solid Waste Management problems in Kisumu City, providing a more comprehensive understanding of the research topic. This enhanced the validity and reliability of research findings. In collecting quantitative data, a questionnaire was used to get demographic information, such as the gender, age, occupation, and educational levels of respondents. They also used to assess the respondents' perception of how Solid Waste has crippled the sanitation of the city and how to solve the environmental problems to ensure a sustainable and cleaner City. The questionnaires were vital in collecting data on solid waste management awareness and modern waste handling techniques compared to rudimentary waste management. In collecting qualitative data, focused group interviews were conducted with local community members to elicit in-depth insights into solid waste management practices and their effectiveness. In-depth interviews were conducted with key informants, including NEMA officials, environmental NGO representatives, and CBO officials, to gather detailed information on Innovative Techniques and Solid Waste Management in Kisumu City.

Target Study Population

The study targeted a diverse population of 351,605 households comprising of 168,892 households from Milimani, 77,713 households from Nyalendo, 50,000 households from Obunga and 55,000 from Kondele. The study also targeted 6 officials from the National Environment Management Authority (NEMA), 7 officials from environmental non-governmental organizations (NGOs), 8 officials from community-based organizations (CBOs), 10 recyclers, and 20 waste pickers operating within Kisumu City. Households were considered the primary generators of municipal solid waste and, therefore, vital to understanding the types, volume, and disposal practices associated with domestic waste. Their inclusion provides a broad community

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perspective on solid waste management practices, challenges, and levels of awareness. NEMA officials were included due to their regulatory and oversight role in environmental protection and waste management policies, offering insights into the current status, enforcement, and gaps in the city's waste management systems.

In addition, the inclusion of environmental NGO and CBO officials was crucial since these organizations are often involved in community sensitization, waste management initiatives, and grassroots innovation. Their perspectives help assess the effectiveness of local waste management strategies and community engagement. Recyclers and waste pickers, being directly involved in the waste value chain, provided practical insights into the types of waste commonly recovered, the informal recycling sector's contributions, and the challenges faced on the ground. This multi-stakeholder approach ensured that the study captured a comprehensive and inclusive understanding of solid waste management practices and innovative techniques in Kisumu City.

Sample Size Determination and sampling techniques

The sample size for households in the study was determined using Slovin's formula, which is commonly applied when the population size is known, but the degree of variability is not. Slovin's formula is expressed

$$N=\frac{N}{1+N\,e^2}$$

Where;

n=Sample size

N=Population Size (351,605)

e=Desired margin of error (typically between 0.01 and 0.05)

Let's assume a 5% margin of error (e=0.05)

Calculation

$$N=\frac{351{,}605}{1+351{,}605*0.05^2}$$

N= 399 people

This method ensured that the sample was adequately representative of the wider household population, enabling the researcher to draw meaningful conclusions about household solid waste generation and management practices in Kisumu City.

The sample size for households in the study was determined using Slovin's formula, which yielded a sample size of 399 households from a total household population of 351,605. To ensure representativeness, stratified random sampling was employed to select the 399 households. This approach was crucial in capturing the diversity of residential waste generation and management practices across various socio-economic and geographic zones within Kisumu City.

In addition to the households, the study included 51 key informants, consisting of 6 officials from the National Environment Management Authority (NEMA), 7 officials from environmental non-governmental organizations (NGOs), 8 representatives from community-based organizations (CBOs), 10 recyclers, and 20 waste pickers. These stakeholders were initially identified through purposive sampling based on their expertise and relevance to solid waste management in the city.

To expand and deepen stakeholder engagement, snowball sampling was also integrated into the process. The approach began with the NEMA officials, who referred the research team to relevant CBO representatives

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actively engaged in waste management initiatives. The CBOs, in turn, connected the researchers to local recyclers and waste pickers, especially those operating informally or outside official networks. This referral chain allowed the study to reach a broader and more inclusive range of participants, particularly within the informal sector.

Data Collection instruments

Quantitative Data Collection

The study collected quantitative data using closed-ended questionnaires administered to 399 households, 10 recyclers, and 20 waste pickers. These questionnaires are designed to gather structured data on key aspects such as the types of waste generated, frequency of waste disposal, awareness of waste management practices, and the extent of participation in recycling or reuse activities. The use of closed-ended questions allowed for easier quantification and statistical analysis, making it possible to identify trends and patterns in solid waste management practices among different population groups. This method is efficient for collecting data from a large number of respondents within a short time while ensuring consistency and comparability across responses.

Qualitative Data Collection

Qualitative data, on the other hand, was collected through interviews conducted with 10 NEMA officials, 10 environmental NGO representatives, and 12 CBO officials. These interview schedules are designed to be flexible and open-ended, allowing for in-depth exploration of complex issues such as policy implementation challenges, community engagement strategies, and the perceived effectiveness of innovative techniques in solid waste management. Interviews provide rich, contextual insights that cannot be captured through closed-ended questionnaires, making them ideal for understanding the perspectives and experiences of stakeholders who play a strategic or supervisory role in waste management. The combination of both data collection methods ensured a comprehensive understanding of both the measurable aspects and the underlying dynamics of solid waste management in Kisumu City.

Data collection procedure

The data collection procedure for the study involved a structured and systematic approach to ensure the accuracy, reliability, and completeness of both quantitative and qualitative data. For the quantitative data, trained research assistants administered closed-ended questionnaires to 399 households, 10 recyclers, and 20 waste pickers. Before data collection began, the research team conducted briefing sessions to explain the purpose of the study and ensured that respondents understood their rights, including confidentiality and voluntary participation. The research assistants visited the selected households and work areas for recyclers and waste pickers, following the stratified random sampling framework to identify participants. Respondents were given up to two weeks to complete the questionnaires, allowing sufficient time for thoughtful and accurate responses. Data were collected through face-to-face interactions to clarify any uncertainties and ensure that responses were accurately recorded.

For the qualitative data, the principal researcher or trained interviewers conducted semi-structured interviews with 10 NEMA officials, 10 environmental NGO representatives, and 12 CBO officials. Appointments were scheduled in advance with each participant to ensure convenience and adequate preparation. The interviews were guided by a flexible interview schedule, which encouraged open discussion while covering key thematic areas such as policy implementation, stakeholder collaboration, and the use of innovative waste management practices. With the respondents' consent, the interviews were audio-recorded and later transcribed for analysis. These qualitative interviews complemented the quantitative findings by providing deeper insight into institutional experiences, challenges, and expert perspectives on solid waste management in Kisumu City.

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RESULTS AND DISCUSSION

Types of Solid Waste generated in Kisumu City

The study sought to determine the types of Solid Waste generated in Kisumu City. Various questions were asked and the respondents rated. The results were provided in Table 1.

Table 1: Sources of Solid Waste generated in Kisumu City

No.	Statement	1-SD	2-D	3-N	4-A	5-SA	Total
1.	Marketplaces contribute significantly to the solid waste in Kisumu	48 15.5%	41 13.3%	31 10.0%	98 31.7%	91 29.4%	309 100.0%
2.	Waste segregation at the source is practiced in households	97 31.4%	83 26.9%	36 11.7%	52 16.8%	41 13.3%	309 100.0%
3.	Most waste generated is biodegradable	90 29.1%	82 26.5%	39 12.6%	53 17.2%	45 14.6%	309 100.0%

Source: Researcher, 2025

From Table 1, respondents were asked on whether marketplaces contribute significantly to the solid waste in Kisumu. The results depict that a 61.1% of respondents agreed that marketplaces contribute significantly to the solid waste generated in Kisumu City, implying that many perceive these areas as major sources of waste due to the high volume of commercial activities and organic waste produced. This highlights the importance of targeting marketplaces in solid waste management strategies to address the types of waste generated effectively. The results were supported by Akpan and Olukanni (2020), who investigated waste generation patterns in urban areas of sub-Saharan Africa. Their study highlights that marketplace are key hotspots for solid waste, particularly organic waste such as food scraps, packaging materials, and other commercial discards. Due to high foot traffic and the constant flow of goods, these areas tend to generate large volumes of waste daily. Akpan and Olukanni emphasize the need for targeted waste management interventions in marketplaces to improve overall waste handling in cities reinforcing the importance of focusing on such areas in Kisumu's waste management strategies.

A smaller but notable number (28.8%) of respondents disagreed, suggesting that some residents may not view marketplaces as significant contributors to waste, possibly due to differences in awareness or experience with waste sources in the city. This aligns with the findings by Osinde (2020), who explored public perceptions of waste sources in urban Kenya. Osinde notes that variations in awareness and exposure to different waste-generating zones influence how residents perceive the origins of solid waste. In some cases, individuals may associate waste more with residential areas or informal dumping sites rather than commercial centers like markets. This suggests that public perception is shaped not only by actual waste volumes but also by personal experience and visibility of waste sources explaining why some Kisumu residents may underestimate the role of marketplaces. A few respondents (10.0%) remained neutral, which may indicate uncertainty or limited knowledge about the role of marketplaces in solid waste generation, emphasizing the need for greater public education on waste sources.

The study sought to find whether waste segregation at the source is practiced in households. The results show that 58.3% of the respondents disagreed that waste segregation at the source is practiced in households, implying that a great number of households do not separate their waste, which poses challenges to effective

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solid waste management in Kisumu City. This suggests limited adoption of segregation practices, which could hinder recycling efforts and proper waste handling. This concurs with Sharma et al. (2021), who examined household waste management behaviors in developing urban contexts. Their study found that a lack of awareness, inadequate infrastructure, and limited policy enforcement are major barriers to source segregation in many cities. Sharma et al. emphasize that without targeted education and support mechanisms, households are unlikely to adopt segregation practices, which in turn hampers recycling efforts and increases the burden on waste management systems. This directly reflects the challenges observed in Kisumu, where low adoption of source segregation undermines efficient solid waste handling.

A smaller portion (30.1%) of respondents agreed, indicating that while some households do practice waste segregation, these cases are not widespread. This was supported by Parsa et al. (2024), who explored the adoption of sustainable waste practices in urban households. Their study highlights that while some communities, particularly those with higher environmental awareness or better access to waste services, engage in segregation at the source, such practices remain limited in scope. Parsa et al. attribute this to socioeconomic disparities, lack of public education, and inadequate municipal support, which collectively restrict widespread adoption. This supports the Kisumu findings, where isolated efforts at segregation exist but are not yet the norm citywide. A few respondents (11.7%) remained neutral, which may reflect uncertainty or lack of knowledge about household waste practices, highlighting a need for increased awareness and education on the importance of source segregation.

Respondents were asked on whether most waste generated is biodegradable. The results show that most of the respondents (55.6%) disagreed that most waste generated in Kisumu City is biodegradable, implying that a great number of people perceive the waste composition to include significant amounts of non-biodegradable materials. This suggests that solid waste in the city may be more diverse and complex, posing challenges for management and disposal. This is supported with the observation made by the research during field visit where it was established that most of the waste in the dumping sites were not biodegradable.

Plate 1

Source: Researcher, 2025

A smaller portion of respondents (31.8%) agreed, indicating that some believe biodegradable waste forms a major part of the waste stream, which may reflect localized experiences or awareness of organic waste presence. A few respondents (12.6%) remained neutral, possibly reflecting uncertainty or mixed perceptions about the types of waste generated, highlighting the need for better information on waste composition to inform management strategies.

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Respondents were asked to indicate the type of waste they mostly generate. The results were shown in Figure 2.

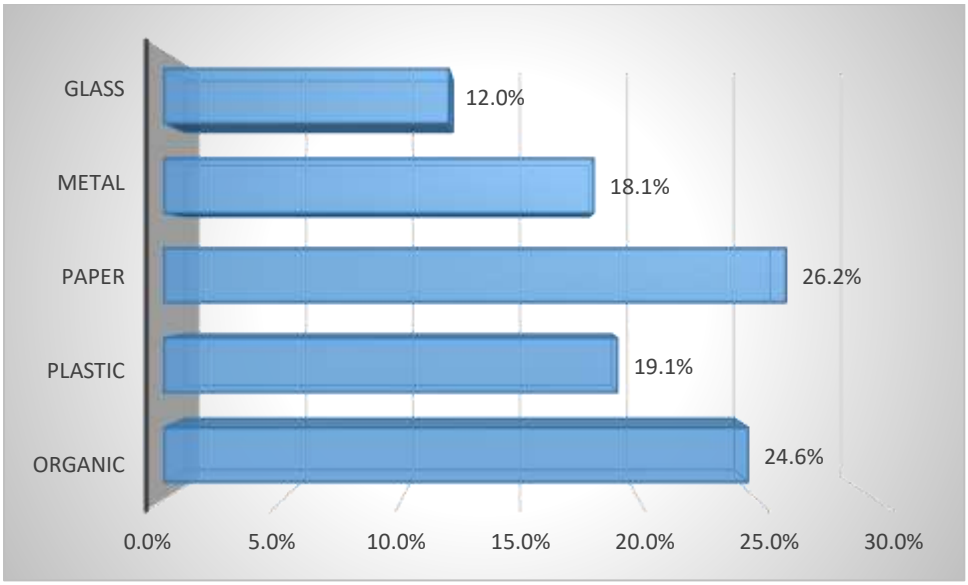

Figure 2: Most generated type of waste

Source: Researcher, 2025

The findings show that most respondents (50.8%) generate paper and organic waste, indicating these are the predominant types of solid waste in Kisumu City. A great number (19.1%) of respondents also produce plastic waste, highlighting its significant presence in the waste stream. This is supported by the photo taken by the researcher during field work. The photo indicated plastic waste that has been generated by households in Kisumu City.

Plate 2

Source: Researcher, 2025

A smaller proportion of residents generate metal waste, while only a few reported generating glass waste, suggesting these types are less common in the area. Overall, this distribution reflects the diverse nature of

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solid waste in Kisumu City, with organic and paper waste being the most frequently produced materials, which has important implications for waste management strategies and recycling initiatives in the city.

The above results were in line with the information obtained from CBO representatives when asked during interview to state types of waste that community members typically generate, and how it is usually handled at the local level. CBO representative 1 stated that;

"Community members mostly generate organic waste from food, plastics, paper, textiles, and sometimes electronic waste. At the local level, waste is often mixed and collected in communal bins or dumped in open areas due to inadequate collection systems. Some households burn their waste, while others rely on informal waste pickers for disposal or recycling."

The responses from the questionnaires and the interview both highlight the dominance of organic, paper, and plastic waste in Kisumu City. While the survey captures the types of waste commonly generated, the CBO representative adds context by explaining local handling practices, such as mixing, open dumping, or burning. Together, these insights emphasize the need for improved segregation and collection systems tailored to the most prevalent waste types.

Respondents were also asked to state the type of waste they consider to be most difficult to manage. The results were shown in Figure 2.

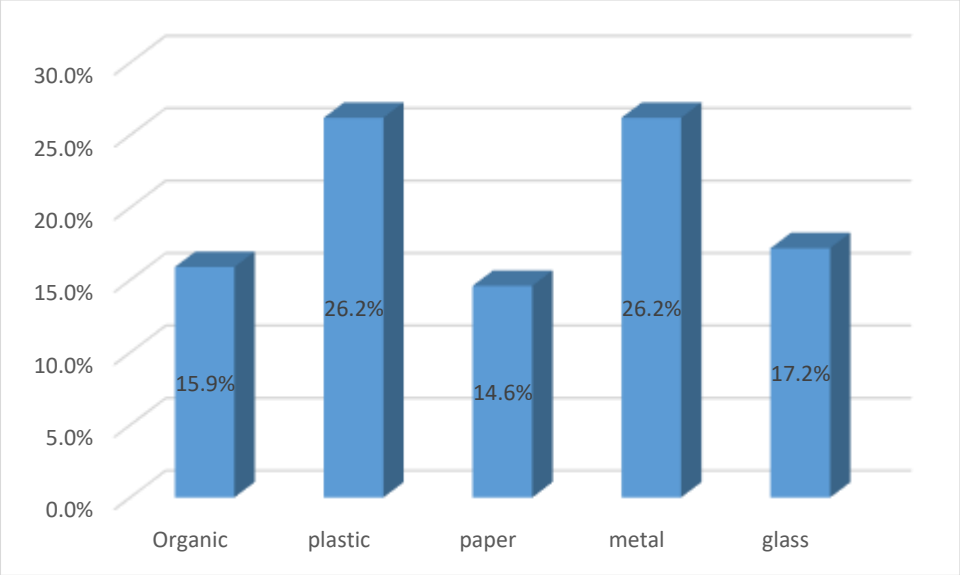

Figure 2: Most difficult waste to manage

Source: Researcher, 2025

The findings show that most respondents (52.4%) consider metal and plastic waste to be the most difficult to manage, indicating these materials pose significant challenges in the waste management process in Kisumu City. A notable number of respondents (15.9%) also find organic waste difficult to handle, suggesting issues with its decomposition or disposal. Fewer respondents (17.2%) regard glass and paper waste as challenging, implying these types may be easier to manage or recycle.

The above findings were similar with the results obtained from NEMA officials during interview when asked to state the challenges that NEMA face in managing the different types of solid waste generated in Kisumu. NEMA official 2 stated that;

"We face several challenges, including inadequate infrastructure for waste segregation, limited public awareness, and insufficient funding for monitoring and enforcement. Additionally, the growing population

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has led to increased waste generation, including hazardous and electronic waste, which are not always properly categorized or disposed of, complicating sustainable management efforts."

The questionnaire responses and the NEMA interview both highlight significant challenges in managing certain waste types, particularly metal, plastic, and organic waste. While respondents identify these materials as difficult to handle, NEMA officials point to infrastructure limitations, public awareness gaps, and funding constraints that hinder effective segregation and disposal. Together, these insights underscore the complexity of waste management issues facing Kisumu City.

Participants were asked on whether they separate their waste before disposal. The results were shown in Figure 3.

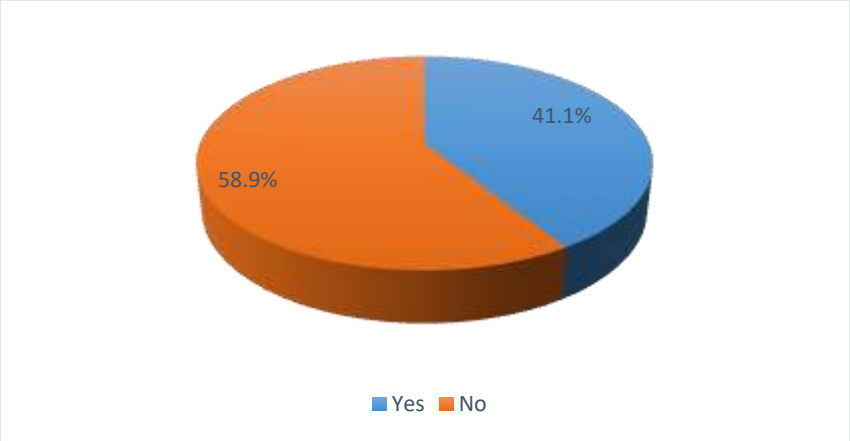

Figure 3: Waste separation before disposal

Source: Researcher, 2025

The findings show that the majority of respondents (58.9%) do not separate their waste before disposal, which implies that waste segregation practices are not yet widely adopted in Kisumu City. This suggests that most residents may lack awareness, resources, or motivation to separate waste, posing challenges for effective recycling and waste management efforts. However, a smaller but significant number (41.1%) of respondents do practice waste separation, indicating some level of environmental consciousness and the potential for promoting more sustainable waste handling techniques in the city.

Participants were also asked on their household generate hazardous waste such as batteries and chemical. The findings were shown in Figure 4.

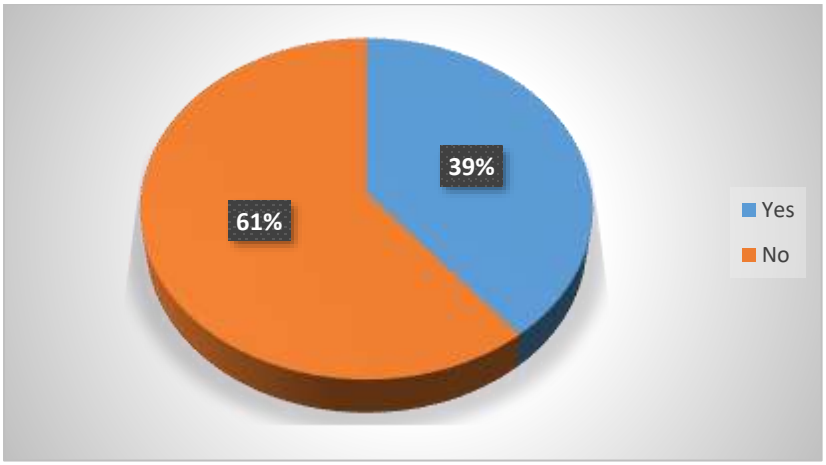

Figure 4: hazardous waste generated by household

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Source: Researcher, 2025

The results depict that the majority (61%) of respondents do not generate hazardous waste such as batteries and chemicals, suggesting that this type of waste may be limited to certain households or specific activities within Kisumu City. However, a significant minority (39%) do produce hazardous waste, indicating the presence of potentially harmful materials that require careful management to prevent environmental and health risks.

The finding that most households in Kisumu City do not generate hazardous waste, while a notable minority do, is supported by Forti et al. (2020), who analyzed global e-waste and hazardous waste trends. Their study indicates that although hazardous household waste such as batteries, chemicals, and electronic waste is generally produced in smaller quantities compared to organic or general waste, its presence is growing due to increasing access to consumer electronics and chemical-based products. Forti et al. emphasize that even small amounts of improperly managed hazardous waste can pose serious environmental and health risks, highlighting the need for targeted awareness and disposal mechanisms, as relevant to the Kisumu context

Respondents were asked on whether they compost waste. The findings were shown in Figure 4.10.

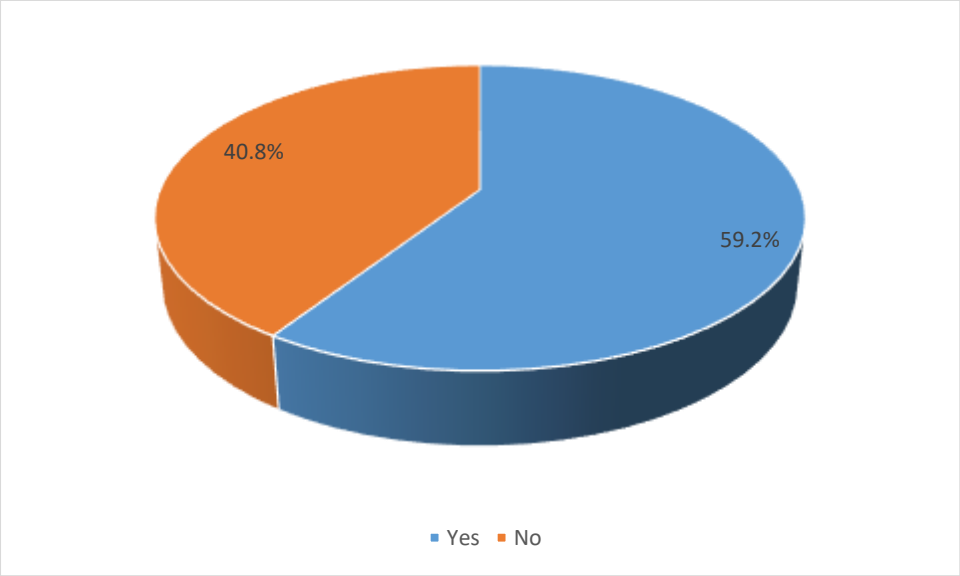

Figure 5: Compost of organic waste

Source: Researcher, 2025

The results depict that the majority (59.2%) of respondents engage in composting waste, indicating a positive level of awareness and participation in environmentally friendly waste management practices in Kisumu City. This suggests that many households recognize the value of composting, particularly for organic waste, which can help reduce the volume of waste sent to landfills and promote sustainable agriculture. However, a significant minority (40.8%) do not compost their waste, which points to opportunities for further education and support to increase composting adoption and enhance overall solid waste management in the city.

The finding that a majority of respondents in Kisumu City engage in composting aligns with the observations of Nabi and Nema (2024), who explored organic waste management practices in urban communities. Their study highlights that composting is gaining traction in many cities, especially where organic waste forms a large portion of household waste. Nabi and Nema emphasize that composting not only reduces the pressure on landfill sites but also contributes to soil enrichment and sustainable urban agriculture. However, they also point out that gaps in awareness, training, and access to composting resources limit broader adoption. This supports the Kisumu findings, where composting is practiced by many but still presents room for expansion through education and community support.

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The study sought to find from the respondents the frequency at which they dispose organic waste. The findings were shown in Figure 6.

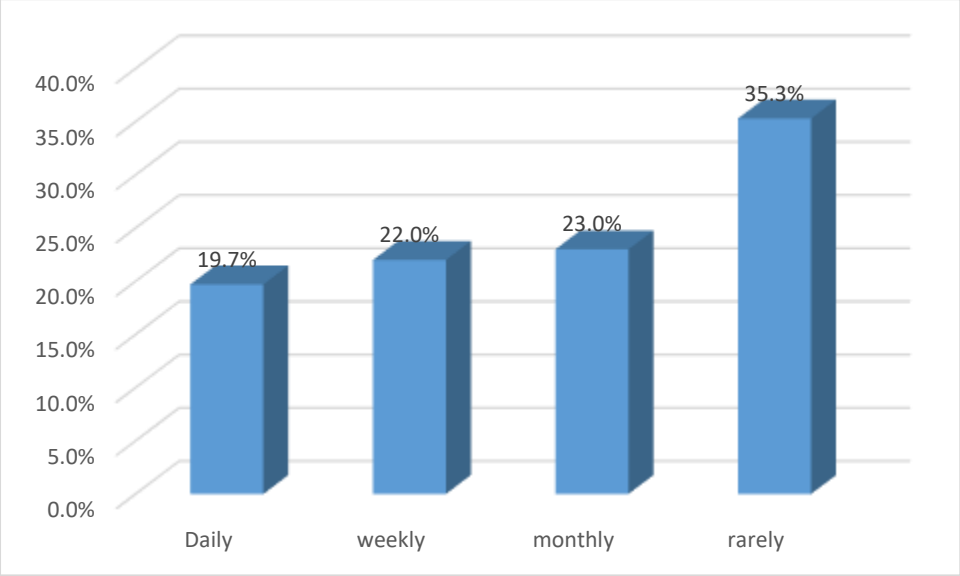

Figure 6: Frequency of organic waste disposal

Source: Researcher, 2025

The results depict that a smaller proportion (19.7%) of respondents dispose of organic waste daily, while a slightly larger group (45.0%) does so weekly or monthly. However, the majority (35.3%) rarely dispose of organic waste, which suggests that many households may either accumulate organic waste for longer periods or use alternative methods such as composting. This pattern indicates variability in organic waste disposal habits across Kisumu City, reflecting differing levels of waste management practices and possibly challenges in regular waste collection services.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The study sought to determine the types of Solid Waste generated in Kisumu City. Descriptive statistics was used to analyze the primary data that were collected. The study established that most of the households and the people within including markets generate solid waste. This solid waste included glasses, metals, plastic, papers and organic waste. Solid waste waste such as plastic, metal and glasses were difficult to manage. Most of the respondents stated that market places contribute significantly to the solid waste in Kisumu, waste segregation at the source was not practiced in households, most waste generated was not biodegradable and most households do not separate their waste before disposal.

Conclusion of the study

Solid waste in Kisumu City is generated mainly by households and markets, with a variety of materials including glass, metal, plastic, paper, and organic waste. Among these, plastics, metals, and glass are particularly difficult to manage due to their non-biodegradable nature. The lack of waste segregation at the source in most households exacerbates the challenge, as biodegradable and non-biodegradable wastes are often mixed together before disposal. Markets contribute significantly to the overall waste load, further straining the city's waste management systems. Therefore, the study concluded that Kisumu City faces significant challenges in solid waste management due to the diverse types of waste generated, limited segregation practices, and the predominance of non-biodegradable materials.

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Recommendations of the study

Given that households and markets in Kisumu City generate various types of solid waste including glass, metal, plastic, paper, and organic waste, it is essential to improve waste segregation practices. The city should implement and promote waste segregation at the source by educating residents on separating biodegradable from non-biodegradable waste. This will enhance recycling efforts and reduce the volume of waste that ends up in landfills, making waste management more efficient.

Since plastics, metals, and glass were identified as particularly difficult to manage due to their non-biodegradable nature, Kisumu City should invest in recycling facilities and partnerships with private waste recyclers. Establishing dedicated collection points for recyclable materials will encourage residents and businesses, especially in markets, to participate in recycling programs, thus minimizing environmental pollution and promoting sustainable waste management. Marketplaces contribute significantly to the solid waste burden in Kisumu, highlighting the need for targeted interventions in these areas. The city should implement waste management programs specifically tailored for markets, including the provision of adequate waste bins, frequent collection services, and awareness campaigns directed at vendors and market users to encourage proper waste disposal and reduce littering.

Lastly, to support these efforts, the city government should strengthen policies and enforcement mechanisms related to waste management. This could include fines for improper disposal, incentives for waste reduction and recycling, and collaborations with community groups to promote behavioral change. These combined measures will foster a more organized and sustainable solid waste management system in Kisumu City.

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