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Solid Waste Management Practices in Nakasongola Town Council, Uganda

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Authors' contributions

This work was carried out in collaboration among all authors. Author CAA formulated the study objectives, searched for related literatures, formulated the research methodology, collected and analyzed the data and typeset the manuscript. Author AN Searched for related literature, formulated the research methodology, analyzed the collected data and discussed the findings. Author AB formulated the study title, analyzed the collected data, typeset and proofread the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Solid waste generation rates are rising and the world's cities are believed to be generating about 2.01 billion tons of solid waste, amounting to a footprint of 0.74 kilograms per person per day. The rapid population growth and urbanization has exacerbated the condition concerning solid wastes. This study focused on the management of the solid wastes in Nakasongola Town Council, Uganda. Specifically, it aimed at the determining of the types of wastes generated, determined the existing solid waste management methods employed by the residents in the area, and examined the factors that influenced the solid waste management practices among the residents of the town council. A descriptive survey design was utilized to collect both quantitative and qualitative data from the 160

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households within Nakasongola Town Council. Data were gathered through structured questionnaires, interviews, direct observations and documentary reviews. Key findings with their corresponding means, indicate organic wastes (4.21), plastics (4.26), rubbish and ashes (3.65) were the major types of wastes produced by the residents of Nakasongola Town Council. Incineration (4.36), composting (4.29) and sanitary landfill (4.15) were the main practices used to manage solid wastes in the town council. However, the solid waste management practices in the study area are influenced by the income levels of the residents (86%), household size (66%), level of education (59%) and stability of the residents living in the town council (72%) among others. The study concludes that solid waste management practices in Nakasongola are significantly influenced by demographic factors, particularly attitudes, income levels, and knowledge of waste management, highlighting the necessity for targeted interventions to improve waste management outcomes in the community. Based on the findings, the study recommends implementing comprehensive community education programs on solid waste management, introduction of affordable waste disposal options, and adoption of a policy for better management of solid wastes at the lowest level of governance.

Keywords: Household waste; solid waste management; waste disposal practices; waste generation; Uganda.

1. INTRODUCTION

Worldwide, solid waste generation rates are rising and the world's cities are believed to be generating about 2.01 billion tons of solid waste, amounting to a footprint of 0.74 kilograms per person per day [1]. With the rapid population growth and urbanization, annual waste generation is expected to increase to 3.88 billion tones by 2050 [2]. Developed countries produce more wastes than developing countries per capita because they have higher levels of consumption [2]. According to the United Nations Environment Programme (UNEP), Americans generated more waste than any other nation in the world with 4.5 pounds (2.0 kg) of solid waste per person per day, 55% of which is contributed as residential garbage [3]. On the other hand, developing nations produce lower levels of waste per capita with a higher proportion of organic material in the solid waste stream [3;4]. The unsustainable waste management practices in any place may create serious health, safety, and environmental consequences [5,6].

1.1 Historical Background

Ancient cities in Greece and the eastern Mediterranean had a system for waste removal, with property owners responsible for cleaning streets. The first known law forbidding this practice was established in Athens in 320 BCE. Disposal methods were crude, with open pits outside city walls. As populations increased, efforts were made to transport waste farther out of cities. (Rahman & Alam, 2020). After Rome's fall, waste collection and sanitation declined throughout the Middle Ages. Scavengers were introduced in the 14th century, but smaller towns still threw waste into the streets. England required official scavengers in 1714. In the 18th century, municipal garbage collection began in Boston, New York City, and Philadelphia, but waste disposal methods were crude, like dumped into the Delaware River downstream [7]. In the late 19th century, technological advancements in solid-waste management, including the introduction of watertight garbage cans and sturdier vehicles, led to significant advancements in waste treatment and disposal practices. By the early 20th century, 15 percent of major American cities were incinerating waste, but open dumping and improper incineration continued to cause pollution and public health issues [8]. Waste in many countries was classified as hazardous or non-hazardous with separate regulations for disposal. Landfills are designed to minimize public health and environmental risks. New refuse incinerators recover heat energy from waste and have air pollution control devices. Modern solid-waste management plants in developed countries prioritize recycling and waste reduction at the source, rather than incineration and land disposal [9].

1.2 Theoretical Background

The study is underpinned by two theories of the Solid Waste Management Theory and the Theory of Planned Behavior. The Waste Management Theory (WMT) was founded in 2004 by three scholars namely Eva Pongrácz, Paul Phillips and Riitta Keiski [10] as a framework that aimed to prevent waste from causing harm to human health and the environment. It was derived from industrial ecology, which focused on

manufacturing and product design. WMT encourages firms to reduce waste by increasing the proportion of non-waste products in their processes. Waste is a loss of valuable resources, such as materials and energy, and WMT encourages resource conservation through waste management and avoidance of resource loss [11]. The Theory of Planned Behavior, postulated by Ajzen [12], is relevant to this study, as it helps in promoting sustainable waste practices in work and home environments. It emphasizes the importance of both contextual organization and individual factors in shaping waste behavior. The factors associated with solid waste management practices among residents, both organizations and individuals, can create different barriers to waste reduction within and between contexts. This theory informs interventions to promote solid waste management behaviors across these contexts.

1.3 Contextual Background

Solid waste may be defined as all discarded solid materials resulting from households, industrial, healthcare, constructional, agricultural, commercial, and institutional sources. Solid waste generated in a city town is often referred to as municipal solid waste. In other literature and jurisdictions this category may exclude sewage, dissolved solids in water, and industrial waste [13]. In this study, no exclusions were made for the reason that in most developing countries, most of the solid waste is not sorted at source, collection, transportation and disposal points. Thus, municipal waste in the context of developing countries may include waste that would not ordinarily be considered municipal waste. Solid waste management refers to the planning, financing and implementation of programs for solid waste collection, transportation, treatment and final disposal in an environmentally and socially acceptable manner [14]. Failure to adhere to set standards at any of the various stages constitutes “poor solid waste management”. Therefore, in order to avert the challenges paused by poor solid waste management practices, reduce, reuse, recycle and disposal practices have been implemented [15].

In Uganda, the implementation of the waste management hierarchy, as envisaged by The National Environment Act (2019) and The Waste Management Regulations (2020) provide the required enabling regulatory environment to support a circular economy for a closed loop system where secondary resources are reintroduced back into the economy. Studies in Kampala and Mukono indicate that the generation of solid waste is influenced by family size, education level, and income among other factors [16]. In addition to population growth that adds to the volumes of waste generated, increased consumption rates, excessive packaging, and throw-away attitudes aggravate the waste problem and put pressure on the environment and limited resources given the fact that source reduction practices are at the lowest more especially among the food vendors [17]. Bbira and Nabukonde [18] argue that the rationale of effective public participation is based on the fact that every household generates waste and can be affected directly and indirectly if household waste is not well managed. Apio et al. [19] reported that collection of waste in paper bags or metallic bins as well as awareness of solid waste management laws are some of the factors associated with proper waste management. SWM is considered to be the most important environmental problem in urban areas of many countries [20]. The rapid increase in population in urban areas has resulted in an increasing amount of waste, making it challenging for municipalities to manage it effectively [21]. Towns and urban centers are mainly characterized by having limited access to information, especially on improving waste management systems and using waste in an economically productive way [22].

Most urban centers in Uganda generate more solid waste than they can adequately collect and dispose of. In most of these towns, only 50% of the generated waste is collected. In Nakasongola Town Council 30-40% of the waste generated is collected by the council and a sizable council annual budget goes to waste management [23]. Most of the wastes generated in the area have been spontaneously dumped and others burned due to lack of alternative options for managing the wastes. Such wastes find their way into nearby dumps and wetlands, hence becoming habitats for disease-carrying insect vectors and rodents that transmit various kinds of diseases in addition to degrading the environment [23]. This study, therefore, intended to address the knowledge gap by investigating the factors that influenced the solid waste management practices by the residents of Nakasongola Town Council, Uganda. Three objectives were set out to achieve the study aim. (i) To classify the waste produced by residents of the Central Ward in Nakasongola Town Council, Nakasongola

District; (ii)To determine the existing solid waste management methods employed by residents of the Central Ward in Nakasongola Town Council; and (iii) To examine the factors that influenced the solid waste management practices among residents of Nakasongola Town Council.

2. METHODOLOGY

The research took place in the Central Ward of Nakasongola Town Council, situated within Nakasongola District, a locality in Central Uganda with an elevation of 1,080 meters. Nakasongola Town Council is proximate to the villages of Wabinyonyi and Kyalubanga (Fig. 1). The selection of Nakasongola Town Council as the study area was deliberate, driven by the substantial population and numerous businesses operating within, leading to the generation of significant volumes of solid waste that necessitate effective minimization strategies. According to the Uganda Bureau of Statistics [24], the estimated population of this town is 11,700, with 53% being male and 47% female. Nakasongola District Natural Resources [23] further indicate that there are 300 households and businesses operating in the central ward, all of which were expected to be included in the study. Using the Yamane's formula (1967), the sample size was calculated, which was included in the study.

$$n = {}^{N}/_{1 + Ne^2}$$

N = Total population of registered residents/business community members
e = the desired degree of precision set at 5%.

$$n = \frac{300}{1+300x\ 0.05^2}$$
$$n = 171$$

The calculated sample size was considered appropriate for achieving the desired degree of precision in the study's findings. However, only 160 respondents filled and returned the questionnaires, representing the 94% response rate, which was deemed desirable.

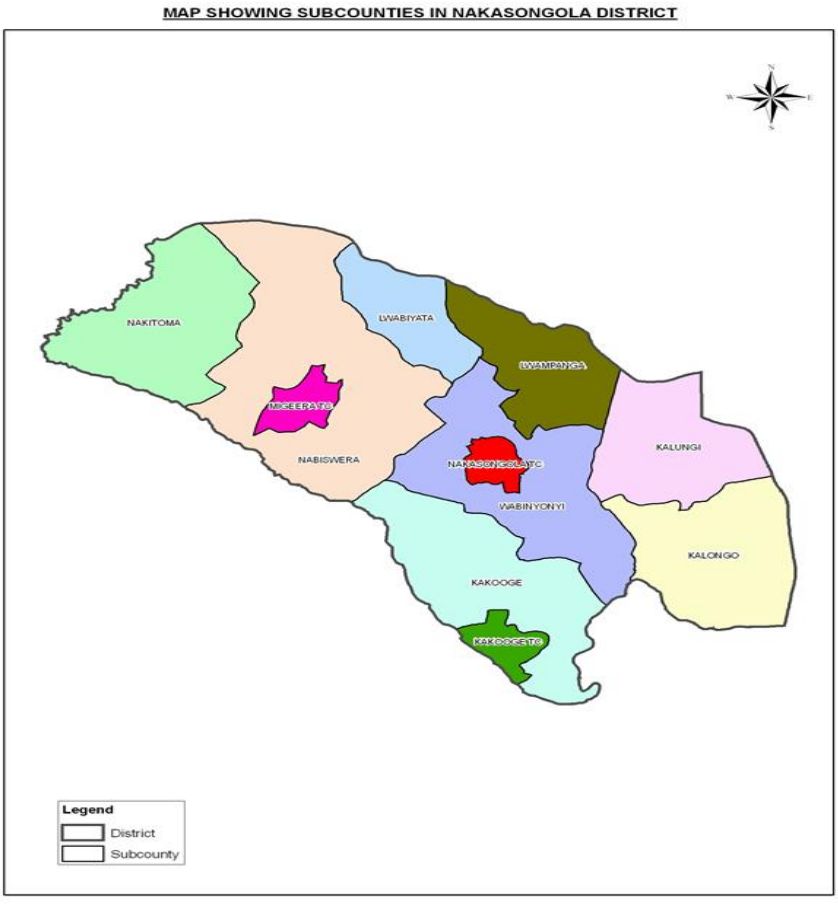

Fig. 1. Map of Nakasongola District, showing the location of the town council (2023)

The study employed a descriptive cross-sectional study, as outlined by Ihudiebube-Splendor and Chikeme [25] that offer data for describing the status of phenomena or relationships among phenomena at a specific point in time, resembling a "snapshot" capturing the frequency and characteristics of a condition in a population. The choice of a cross-sectional design for this study was deliberate, aligning with its suitability for population-based surveys. In the context of this research, a cross-sectional design proves beneficial for public health planning, monitoring, and evaluating solid waste management practices in Nakasongola Town Council. A combination of simple random sampling and purposive sampling methods to select representative respondents for participation. This dual approach aimed to ensure a balanced and comprehensive representation of individuals, considering both the element of chance through random sampling and the intentional selection of participants based on specific criteria through purposive sampling. This combination of sampling methods was chosen to enhance the diversity and relevance of the respondent pool, contributing to a more robust and insightful study outcome. According to Noor et al. [26], simple random sampling is characterized as a subset of a statistical population in which each member has an equal probability of being chosen. In the context of this study, this technique was employed to recruit study participants, specifically residents of the area who served as key respondents. The choice of simple random sampling was grounded in its inherent objectivity and lack of bias, to enhance the reliability and generalizability of the findings to the broader population of residents in the study area. This method ensured that each member of the total population had an equal chance of being selected, minimizing subjectivity in participant recruitment.

Purposeful sampling, as highlighted by Palinkas et al. [27], is a valuable technique frequently employed in qualitative research. It involves the identification and selection of information-rich cases to make the most effective use of limited resources. In the context of this study, purposeful sampling was utilized to identify and select senior individuals or leaders with specialized knowledge or experience related to the phenomenon of interest. Purposive sampling was instrumental in recruiting local leadership within the area, including LC chairpersons, the Chief Administrative Officer (CAO), and the Councilors.

The primary tool employed for data collection in this study was the questionnaire, as emphasized by Jilcha [28]. A questionnaire is essentially a compilation of standardized questions, referred to as items, structured in a predetermined format to gather individual data on specific topics.

This method is particularly well-suited for studies involving a substantial number of respondents spread across expansive geographical areas, facilitating the systematic collection of information from a diverse and widespread participant pool. In addition, interviews were used to gather data from the key informants allowing for in-depth exploration of subjects and the extraction of nuanced insights concerning the study. Observational approach was also used to collect data which provided a direct and unobtrusive means of capturing real-time occurrences, contributing valuable insights to the research inquiry. The data collected from primary sources underwent analysis using Microsoft Excel and the Statistical Package for Social Sciences (SPSS). For a comprehensive approach, qualitative data analysis was employed using thematic analysis to triangulate the quantitative data analysis. Regression analysis was employed to assess relationships among the variables studied. This analytical approach aimed to provide a thorough and well-rounded interpretation of the data, incorporating both numerical insights and qualitative perspectives to enhance the overall robustness of the study's findings.

3. RESULTS AND DISCUSSION

3.1 Demographic Characteristics of the Respondents

A comprehensive overview of the socio-demographic characteristics of the study participants, shed light on various aspects that influenced their perceptions and practices related to solid waste management. In terms of gender distribution, the results revealed that 53.8% of the respondents were male, while 46.3% were female, indicating a relatively balanced representation. Considering the age of the respondents, a diverse range is evident, with the most (33.1% and 31.9%) falling within the age groups of 31-40 and 41-50 respectively. This diversity allowed for a nuanced exploration of how different age cohorts engaged in and perceived solid waste management practices. The marital status of respondents showed that a significant portion of the respondents were

married (70%), while smaller percentages were single (15.6%), divorced (8.8%), and widowed (5.6%). Educational background varied among participants, with slightly over half (50.6%) having completed primary education, 26.3% of the respondents with no formal education, and 23.1% had attained the secondary level of education. The religious affiliation of respondents exhibits diversity, with 40.6% of respondents being Anglican, 17.5% of the respondents Catholics, 6.3% being Muslims and 35.6% as belonging to other religions. This detailed socio-demographic breakdown (Table 1) provides a foundation for understanding the potential influence of demographic factors on solid waste management practices and perceptions in the study.

3.2 Categories of solid waste generated at Nakasongola Town Council

Quite a number of categories of solid wastes are generated by residents of Nakasongola Town Council. These include organic wastes, paper wastes, hazardous waste, plastic wastes among others as shown in Table 2.

Table 2 shows the respondents' perceptions of various solid waste categories. The results indicate a robust level of agreement among respondents for certain waste types generated at Nakasongola Town Council. Plastic wastes and Organic waste had the highest means of 4.26 and 4.21 respectively signifying that such types of wastes are the most produced by the residents. Nakasongola district is largely agricultural and this could be the reason why organic wastes are prominent. In addition, plastics do not easily rot and hence tend to accumulate into the environment, a scenario common to other main towns. Paper wastes and rubbish and ashes (Plate 1) were the other types of wastes commonly generated in the study area, corresponding to the means 3.93 and 3.65 respectively, indicating the third and fourth commonly generated wastes. The ashes are generated as a result of burning the organic wastes produced in the area. The findings concur with Kiguli et al. [29] and Debrah et al. [30] who posit that quite a number of solid wastes including wood and wood products, food and food wastes, glass and plastic metals are the major types of wastes generated by urban homesteads.

The electronic wastes were generated by the mean sample equivalent to 3.38, also showing a high proportion of the wastes generated. The prevalence of electronic waste, such as old phones, radios, TVs, electric wires, and other electronic items, is widespread in Uganda, a characteristic that is likely mirrored in Central Ward. The influx of affordable electronic goods from China in Ugandan markets has heightened concerns about electronic waste. Recognizing the challenges posed by e-waste, the Government of Uganda has taken proactive measures by incorporating e-waste provisions in the National Environment Act of 2019 and Waste Management Regulations of 2020 [31,32].

Table 1. Socio-demographic characteristics of the respondents

Variables	Responses	Frequency	Percentage
Gender	Male	86	53.8
	Female	74	46.3
Age	18 -30	24	15
	31- 40	53	33.1
	41- 50	51	31.9
	50 -60	25	15.6
	60 +	7	4.4
Marital Status	Single	25	15.6
	Married	112	70
	Divorced	14	8.8
	Widowed	9	5.6
Education	No formal Education	42	26.3
	Primary level	81	50.6
	Secondary Level	37	23.1
Religion	Islam	10	6.3
	Catholic	28	17.5
	Anglican	65	40.6
	Others	57	35.6

Source: Field Survey, 2023

3.3 Solid Waste Management Practices undertaken in Nakasongola Town Council

The study investigated the solid waste management practices among residents of Nakasongola Town Council. The subsequent findings are as detailed in Table 3.

The results show that the most common solid waste management practices employed in Nakasongola town council include but not limited to incineration, composting, fermentation and landfill, recycling and open burning with respective means of 4.36, 4.29, 4.15, 4.14 and 4.13 with incineration being practiced by the majority of the respondents. Sanitary landfill, a very dangerous mode of waste management the makes the environment unsightly, and can act as breeding grounds of very dangerous vectors like mosquitoes, mice is still practiced as observed in Plate 2.

Table 2. Categories of solid wastes generated from Nakasongola Town Council

Waste Categories	SD	D	NS	A	SA	M	Std. Dev
Organic waste	3.1	0	3.8	59.4	33.8	4.21	0.79
Paper waste	3.1	5	13.8	51.9	26.3	3.93	0.94
Non-combustibles waste	29.4	6.3	5.6	50	8.8	3.03	1.45
Hazardous waste	10.6	40	13.8	30	5.6	2.80	1.15
Construction debris	26.9	2.5	14.4	3.1	53.1	3.53	1.73
Plastic waste	0.6	1.9	7.5	50.6	39.4	4.26	0.73
Street sweepings	10	3.1	40.6	23.8	22.5	3.46	1.17
Rubbish and ashes	8.1	11.3	18.8	31.3	30.6	3.65	1.25
Electronic waste	11.9	15	10.6	48.8	13.8	3.38	1.24

Source: Field Survey, 2023

Plate 1. Poorly disposed ashes packed in gunny bags (2023)

Table 3. Solid waste management practices in Nakasongola town council

SWM Practices	SD	D	NS	A	S A	M	Std.Dev
Incineration	41.9	0	55	1.9	1.3	4.36	0.64
Composting	40.6	0.6	53.1	1.9	3.8	4.29	0.74
Fermentation	36.3	52.1	1.3	8.8	0.6	4.15	0.87
Salvaging	4.4	11.3	1.9	52.5	30	3.92	1.07
Recycling	0.6	7.5	3.1	54.4	34.4	4.14	0.84
Sorting and shredding	51.2	7.5	37.5	0.6	3.1	1.96	1.09
Sanitary landfill	2.5	7.5	0.6	51.2	38.1	4.15	0.94
Open burning	7.5	1.3	3.1	46.3	41.9	4.13	1.07

Source: Field Survey, 2023

Plate 2. A Heap of wastes dumped on land (2023)

The prevalence of open waste burning and burying is often linked to the lack of accessibility to formal collection services and a limited awareness of the environmental consequences associated with these practices [33; 31]. In the central ward, such practices are common, as many residents perceive open burning as the easiest method for disposing of non-organic solid waste. This finding highlights the challenges and informal strategies adopted by the community in managing solid waste, emphasizing the need for improved waste disposal infrastructure and environmental education. In relation to this finding, one of the key informants had this to say:

> *"Majority of the residents in this area do not care about the environment around them. They are less knowledgeable about the safest methods of disposing of the wastes. They find it easy to indiscriminately dump the solid wastes in the surrounding environment, not caring about the dangers that can emanate from such acts".*

3.4 Factors that Influenced the Solid Waste Management Practices Among Residents of Nakasongola Town Council

The current study sought to examine the factors that influenced solid waste management practices and the findings are as presented in Table 4. The variables examined included: attitudes, education, age, location, Knowledge among others.

Attitudes of the Residents: The results indicate that residents' attitudes significantly influence solid waste management practices. Approximately 92% of participants agreed with positive waste management behaviors, yielding a mean score of 3.99. These findings underscore the importance of residents' attitudes in shaping their behaviors related to solid waste management. Specifically, their perspectives on waste accumulation, disposal, and reuse directly impact recycling habits, proper waste disposal, and waste segregation efforts. The high mean score suggests that initiatives aimed at improving attitudes such as awareness campaigns, educational programs, and community engagement could enhance the effectiveness of waste management strategies. Moreover, the moderate standard deviation highlights the need to consider diverse perspectives and potential barriers within the community to ensure that waste management initiatives resonate broadly and promote active participation and behavioral change. These results align with previous research [31; 34], which identified a correlation between positive attitudes and improved waste management practices.

Table 4. Factors which influenced solid waste management practices in Nakasongola town council

Factors	(SD)	(D)	(N)	(A)	(SA)	M	Std.Dev.
Attitudes of the resident	2 (1.3%)	0	3 (1.9%)	88 (55%)	67 (41.9%)	3.99	1.03
Age of the residents	7 (4.4%)	8 (5%)	3 (1.9%)	49(30.6%)	93 (58.1%)	4.33	1.04
Level of education	26 (16.3%)	25 (15.6%)	15 (9.4%)	37 (23.1%)	57 (35.6%)	3.46	1.50
Gender of the residents	2 (1.3%)	23 (14.4%)	5 (3.1%)	15 (9.4%)	115 (71.9%)	4.36	1.15
Income of the residents	14 (8.8%)	2 (1.3%)	7 (4.4%)	39 (24.4%)	98 (61.3%)	4.28	1.19
The dwelling type of the residents	3 (1.9%)	10 (6.3%)	32 (20%)	50 (31.3%)	65 (40.6%)	4.03	1.02
The size of the household	20 (12.5%)	23 (14.4%)	12 (1.7%)	20 (12.5%)	85 (53.1%)	3.79	1.51

Source: Field Survey, 2023

Age of the residents: The results showed that age significantly influenced waste management practices in Nakasongola town council. Majority (89%) of the respondents represented by the mean score of 4.33 stated that age of an individual greatly influences how s/he manages solid wastes. Findings revealed that the young population sometimes do not care about the environment and disposes off wastes haphazardly thereby degrading the environment. This finding is consistent with Aryampa et al. [13], who stated that older populations prioritize community welfare more than younger individuals and hence do not carelessly dispose wastes into the environment.

Level of Education: More than half (59%) of the respondents demonstrated that the level of education of the respondents play a significant role as far as solid waste management is concerned. Individuals with low levels of education tend not to properly dispose of wastes while those ones with higher education dispose wastes in an environmentally friendly manner. The findings are in agreement with authors like Kihila et al. [15] and Godfrey et al. [35], who noted a positive correlation between higher education levels and improved waste management practices. Kiguli et al. [29] and Mugweri et al. [36] stated that lack of awareness about effective solid waste management practices contributes to ineffective disposal of the wastes, which eventually may contribute to environmental degradation.

Gender of the residents: A notable 81% of respondents recognized gender as a significant factor affecting solid waste management practices, with the mean score of 4.36. The higher mean is an indication of a strong perception of gender's influence on waste management procedures. In comparison to men, women are mainly engaged in activities requiring lower levels of education and skills (waste picking from dump sites; sorting and washing), also women as homemakers are more likely to generate more waste at home than men and may have the duty of disposing of the waste than man. Therefore, gender dynamics must be considered in efforts or policies aiming to enhance waste management, as reflected in the high percentage of respondents acknowledging this influence. The significance of gender roles in waste management is supported by Zondi et al. [32], who argued that women's key responsibilities in family decision-making make their participation in waste management essential. Therefore, appreciating gender roles is likely to positively impact on waste management procedures.

Income of the residents: Income levels emerged as a substantial influencing factor in waste management practices pointed out by about 86% of the respondents, with the mean score of 4.28. The findings reflect a strong relationship between residents' income levels and their waste management behaviors. A mean score of 4.28 suggests that respondents believe higher income correlates with better waste management practices. Despite the majority agreement, the moderate standard deviation of 1.19 indicates variability in perspectives, with some residents emphasizing other factors like education, environmental awareness, or community resources as more impactful. The connection between income and solid waste management practices supports the notion that wealthier households can implement more effective waste management strategies, contributing to a sustainable approach to waste disposal. Other elements such as community support, environmental awareness, and education also significantly influence waste management behaviors, as noted by Aliyu and Amadu [37], Zhou et al. [38] and Kubanza [39], who highlighted the direct impact of economic capabilities on residents' willingness and ability to engage in sustainable waste management practices.

Dwelling residents: The type of dwelling significantly influenced waste management practices, reflected with about 72% of the respondents in agreement with the variable, with the corresponding mean score of 4.03. The moderate standard deviation of 1.02 indicates that, while many residents see a relationship between dwelling type and waste management, others may not fully recognize this relationship. Factors influencing this perspective may include the waste management infrastructure available in different settings like the availability of the rubbish pits, and the respondent’s socioeconomic status. Understanding the implications of affluent and less affluent living can guide the development of tailored waste management solutions that cater to diverse settings [40].

Size of the household: About 65% of the respondents stated household size may influence waste management procedures as compared to smaller households. They mention

that the bigger the size of a household, the more the wastes generated which may have a direct negative relationship towards solid waste management. The results are in agreement with The Global Green Growth Institute (2023) which stated that the amounts of wastes generated is always in correlation with the number of people in a given area [41].

4. CONCLUSION AND RECOMMENDATIONS

A host of wastes including but not limited to organic wastes, plastics, rubbish and ashes are generated by residents in Nakasongola town council. Incineration, composting, sanitary landfill, and open burning are some of the solid waste management practices employed in the town council for management of the solid wastes. The solid waste management practices in the town council are largely influenced by attitudes of the residents, age, level of education, and income levels of the residents among others. For a sustainable environment, the following recommendations are advanced.

- Public awareness programmes: Conduct public awareness campaigns that promote the perceived utility of waste, encouraging recycling and resource recovery among community members.
- Gender-inclusive Initiatives: Develop gender-sensitive strategies in waste management to ensure active participation from all genders for a more holistic approach.
- The Council Management should provide affordable waste disposal options for lower-income households to improve on the better methods of waste disposal.
- The Central Government should adopt and implement a policy for better solid waste management practices and punitive measures should be in place for the offenders of the policy.

DATA AVAILABILITY

The data presented in the manuscript is available on request.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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