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[1]Bonny Brown Olwa & [2*]David Mwesigwa

[1]Student, Master of Arts in Public Administration and Management, Lira University, Uganda.

[2*]Senior lecturer, Department of Public Administration and Management, Lira University,

https://orcid.org/0000-0003-2683-1200

ABSTRACT

Purpose: this study examined the contribution of stakeholder participation to SWM in Lira City East division. Specifically, the study determined the effect of stakeholder participation on solid waste reduction, solid waste recycling and on waste reuse.

Methodology: The study adopted a cross-sectional study design, which employed a mixed methods approach of both quantitative and qualitative methods. The study population consisted of 195 respondents, which included political leaders and civil servants of Lira City East division and heads of household in Lira City East. Both the Simple random sampling technique and purposive sampling technique were used to select a sample of 132 participants. The researcher adopted Self-Administered Questionnaires to collect quantitative data and an interview guide to collect qualitative data. Both descriptive statistics (mean, and standard deviation), and inferential statistics (correlation and regression) were used to analyse numerical data. Content analysis was used to analyse qualitative data.

Findings: The findings revealed a statistically significant positive relationship between stakeholder participation and SWM. Further, it was revealed that stakeholder participation yields a significant effect on waste reduction, waste recycling and waste reuse.

Unique contribution to theory, practice and policy: It is concluded that stakeholder participation affects SWM in Lira City East division. This study contributes an original and empirical-evidence of the contribution of stakeholder participation on SWM in Lira City East division. It is recommended that, for better management of solid waste in Lira City division, the authorities of Lira City east division should sensitise the residents on the possible mechanisms of reducing the amount of waste generated at homestead, how the waste generated can be recycled to other useful forms and how the waste generated can be reused. This study contributes to the reawakening of the urban stakeholders in Lira city and Uganda, as a whole, on the magnitude of the solid waste challenge and how this calls for instantons effort to achieve healthy and cleaner cities/urban centers.

Keywords: *Solid waste, reduction, recycling, reusing, stakeholder participation*

1. Introduction

Solid waste management (SWM) is a global concern which affects every individual and government. Historically, human advancement has been intrinsically linked to the management of solid waste due to its effect on both public and environmental health (McAllister, 2015). Waste management is a growing and overwhelming concern around the world; particularly in developing countries, where waste generation is sharply increasing and there is no sufficient collection and processing infrastructure (Yousefloo & Babazadeh, 2020). According to the World Bank, the annual solid waste generation globally was 1.3 billion tons in 2012 and is expected to grow to 2.2 billion tons by 2025 (Hoornweg & Bhada-Tata, 2012). In the USA, the waste generation per day is approximately 0.64 MT, followed by Germany with 0.14 MT, Mexico with 0.13 MT, and Japan with 0.10 MT (Das et al., 2019). According to Havlicek and Morcinek (2016), interest in environmental problems is not just a modern phenomenon but people were concerned with similar issues in the past, including the pre-industrial era. The industrial revolution of the 16th century attracted many people to settle in urban centres which had better amenities and good employment prospect. This migration of people to cities led to population explosion that in turn culminated to a surge in the volume and variety in composition of wastes generated in cities (Amasuomo & Baird, 2016). The unhygienic urban sanitation resulting from population explosion and mismanagement of waste is believed to have caused the plagues that affected Europe at that time (Nathanson, 2015). It was as a result of that which led to the development of waste-management techniques to combat the spread of disease but the political and social problems of the time did not see great strides in waste management (Nathanson, 2015).

In Africa, waste management dates back to 1340s, when there was a widespread of plagues to Northern part of Africa and Western Europe. A phenomenon known as Black Death, which claimed seventy-five million lives were estimated worldwide. In bid to curbing the never-ending spread of diseases, waste management techniques were developed and a form of reuse and recycling, vegetable wastes were fed to livestock and green waste was used as fertilizer, pigs were fed organic wastes and timbers were reused in construction works (Liyala, 2011). In East Africa, SWM system changed from the colonial days in the 40s, 50s, and 60s when it was efficient because of the lower urban population and adequate resources to the current status that displays those inefficiencies. The centralized Waste Management System has evolved in to the current management mixtures that include decentralized as well as the involvement in the private sector. Waste management in developed parts of region gradually became centralized (Okot-Okumu & Nyenje, 2011), with the introduction of refuse trucks that would collect wastes from points of generation and deposit them at designated sites. In Uganda before the advent of colonialism, waste management was considered the responsibility of the individual households. Urban settlements were non-existent and each household had places for dumping waste generated. The waste was either poured in pits dug outside the homestead or just deposited in the nearby bush.

A number of studies have been carried to examine the relationship between stakeholders, participation and SWM. Studies have examined the influence of influence of stakeholder

participation on domestic waste management in Biashara Residential Area, Kiambu County, Kenya. The finding of the study indicated that participation of stakeholders in SWM had a significant effect on the management of solid waste. Similarly, studies have assessed the effect of stakeholders, participation in SWM. The finding of the study indicated that stakeholder participation had a significant effect on the management of solid waste. A study by Sinthumule and Mkumbuzi, (2019) indicated that community participation was found to be very important in areas of waste separation in households, giving such waste to the waste collector and composting of organic wastes to be used as the fertilizer effectively turning waste to resources. A study by Mwangi, (2011) in Kenya on household SWM in Makina informal settlements, Nairobi and cited the roles of the various stakeholders in waste management as Self-Help groups, Community Based Organizations (CBOs) and Non-Governmental Organizations (NGOS) that were involved in waste separation, collection, transport and disposal.

Uganda enacted the Waste Management Act in 2000. The regulation provides rules for the handling and disposal of such waste and provide the National Environment Management Authority with the necessary powers for the control of waste management in Uganda and any movement of (hazardous) waste into, from or through Uganda, from to or through any area. Lira City enacted a law of waste management in 2006. Also, the National Environment Management Authority (NEMA) with financial support from the World Bank established Municipal Solid Waste (MSW) compositing plant in Lira Municipality which is currently Lira City (NEMA, 2016) to manage solid waste. Whereas the stakeholders in Lira City developed and approved strategic plans to guide the management of solid waste, the management of solid waste still remains a problem in the city (Adong, 2022). It is against the background that this study examined the effectiveness of stakeholder participation in the management of solid waste in Lira City East division.

1.1 Statement of the Problem

Although Uganda as a nation has put in place policies, agencies and authorities to manage waste in the country, the management of solid waste still remains a challenge in many urban areas in Uganda (Aryampa, Maheshwari, Sabiiti, Bateganya& Bukenya, 2019). The National Environment Management Authority (NEMA) with financial support from the World Bank established Municipal Solid Waste (MSW) compositing plant in Lira Municipality which (A study by Ongia (2021) on waste management in Lira City indicated that organic waste contribute 63.2%, open dumping is the commonest method of solid waste dumping. The annual survey carried out in 2018 (UBOS 2018) indicate that over 77% of the households in Uganda still do not have appropriate ways of managing the solid waste generated from the households (Kumar, Takeshima, Thapa, Adhikari, Saroj, Karkee, & Joshi, 2020). Although Lira City enacted a law on waste management in 2006, the daily monitor of 25th September 2019 reported that waste management still remains a big challenge in many households within the city. This is because some households are not in position to meet the periodic cost of waste collection. This leaves many people in a state of mental discussion in regards to the role of stakeholders in the management of solid waste in the city. It therefore provided a germinating field for the study to examine the effectiveness of stakeholders on SWM in Lira City East.

1.2 Purpose of the Study

The study examined the effectiveness of stakeholder participation in SWM in Lira City. Three objectives were addressed, namely: (i) to determine the contribution of stakeholder participation in solid waste reduction in Lira City East Division. (ii) To assess the effect of stakeholder participation in solid waste recycling in Lira City East Division. (iii) To assess the contribution of stakeholder participation in solid waste reuse in Lira City East Division.

1.3 Theoretical and literature review

The theory of waste management gives a detailed description of the concepts and elements of waste management including giving a holistic view of the goals of waste management (Pongrácz, 2002). Waste management theory is based on the belief that waste management is to avoid damage to human health and their surroundings. According to this theory, the accurate description of the term waste and definition of the role of ownership in waste management is important in coming up with an effective waste management process. The theory recognizes that accurate definition of waste and the clarification of the role of ownership in waste management have a role in effective waste management. The rationale of using this theory in this study is that the theory as well as the study is interested in finding new information on the society's definition of domestic waste and domestic waste management as well as the influence that stakeholder participation in waste management has on the effectiveness of the process. On the other hand, the theory of waste management guided this study in that it recognizes that accurate definition of waste and the clarification of the role which stakeholders have in effective waste management.

Several studies have been conducted in several locations to determine the effects of stakeholder participation on waste reduction, all these studies reviewed like (Kotei, Annang, Yirenya-Tawiah (2020), Vutivoradit and Jakkapattarawong (2018), Sinthumule & Mkumbuzi, (2019), and finally Kipkurui, and Obura (2018) Njuguna (2016) were conducted in other geographical location. Hardly have any studies been conducted in Uganda and specifically Lira City West division. This therefore provides the base of this study to fill the gaps. Also, studies such as Kotei, Annang, & Yirenya-Tawiah (2020) only employed qualitative approach. Such methodological gaps will be bridged by this study by the using mixed approach. Whereas several studies have been conducted in several settings to assess the effects of stakeholder participation on waste recycling, studies like (Ndururi, Muriithi and Ochola (2019), Eun (2016), Klunbut et al (2017), Saat et al (2018) and Rodić and Wilson (2017) were conducted in other geographical locations. None of those studies were conducted in Uganda and specifically Lira City East division and therefore provide the basis of this study the fill the contextual gap. Although several studies have been conducted in several settings to examine the effects of stakeholder participation on waste reuse, all these studies like (Abas et al. (2020), Saat et al (2018), Enugu (2018) and finally Manaf, MAA and NIM (2018) were conducted in different countries. None of those studies have been conducted in Lira City West division and this therefore provides the basis to carry out this study.

2. Methodology

2.1 Research *Design*

Research design describes how the research strategy addresses the specific aims and objectives of the study, and whether the research issues are theoretical or policy-oriented (Kothari, 2011). The design of the study was cross-sectional survey design. The advantage of this design is that it is quick and cheap, however it has its disadvantage in that, it is not useful in determining cause-effect and is not useful in analysing behaviours. According to Creswell (2012), the design helps in establishing the relationship between two or more aspects of a situation. Both quantitative and qualitative approaches were adopted. Quantitative approach enabled the researcher to gather numerical data with the help of the questionnaire while the qualitative approach enabled the researcher to gather narrative data with the help of the interview guide.

2.2 Study Population

Study population describes the total collection of elements which have common observable characteristics or patterns that the researcher wishes to make some inferences (Creswell, 2012). This study comprised of the 195 participants in the categories of division mayor (01), division health inspector (01), environment officer (01), division clerk (01), Aler composite manager (01) and households (190) as illustrated on table 1 below.

2.3 Sample size

From the study population of 195, the researcher used Krejcie and Morgan's Table (1970).

Table 1. Target population and sample size

Categories	Target population	Sample size
Mayor	01	01
Division clerk	01	01
Health inspector	01	01
Environment officer	01	01
Aler composite manager	01	01
Households	190	127
Total	**195**	**132**

Source: Primary Data, 2023

2.4 Sampling techniques

Purposive sampling technique was used on mayor, division clerk, heath inspector and environment officer. The reason for purposively sampling them was because they have the mandate in the management of waste in the City. Simple random sampling technique was used

to sample households. Simple random sampling gives an equal opportunity of being selected for the study.

2.5 Data collection procedure

The study involved collection of primary data from the respondents. This was made possible by presenting a letter of introduction from the Dean Faculty of Management Sciences of Lira University, seeking for permission to conduct research. The introductory letter was presented to Division Town Clerk of Lira City East. The letter from the Division Town Clerk was then presented to the respective study participants. Methods of administration of the instruments was self-administration and then drop and collect method where the researcher and the research assistant left the questionnaire with an informant and went back to pick it. This method was preferred because it helps to collect data from a large representative sample.

2.6 Data collection methods

The study employed both quantitative and qualitative data collection methods of data collection. Data was collected with the help of survey questionnaires and interviews. Questionnaire method was used to collect primary data from the household heads while interviews were used to collect data from the key informants in the categories of Mayor, Division Clerk, Health Inspector and the Environment Officer. Self-Administered Questionnaires were used to gather data from household heads. According to Mugenda and Mugenda (2013), a questionnaire is considered the most convenient way of collecting data from respondents because it is easy to administer and obtain data within a short time from a large number of respondents. The Self-Administered Questionnaires were used because it is a cost-efficient way to quickly collect massive amounts of information from a large number of people in a relatively short period of time. The questionnaire consisted of close ended questions because they are easy to answer without provisions for respondents to give explanations. A 5 point Likert standardized questionnaire was used in data collection using rating scales of strongly agree (5), Agree (4), non-committal /not sure (3), disagree (2), strongly disagree (1). The researcher used open-ended face to face interviews to collect information from key informants to obtain more detailed information concerning the study variables. Interview guide was used because they have the advantages of ensuring probing for more information clarification and capturing facial expressions of the interviewees (Amin, 2005). In addition, they also give an opportunity to the researcher to re-visit some of the issues that had been an over sight in other instruments and yet they are deemed vital for the study. The key informants, who are regarded to be conversant with the subject under study, were interviewed by a designed interview guide. The information was collected to supplement that obtained from the responses got from the questionnaires. Interviews helped the researcher to learn about things that were not directly observed and added and the inner perspective to outer behaviour of the respondents. The choice of the interview guide as an information collection instrument is because no single research design can be purely quantitative. A given study can therefore be quantitative with some qualitative aspects as well (Creswell, 2012).

2.7 Quality control methods

This section established at validity and reliability of research instruments. Validity determines if the research instrument truly measures that which it is supposed to measure (Kothari, 2011). To ensure content validity, the tools developed were given to expert judges with expertise in the area of study to score the relevance of each question in providing answers to the study. After the expert opinion, a content validity index (CVI) was computed as indicated in the formula below;

$$CVI = \frac{\text{No of item declared valid by the judges}}{\text{Total No of items on the questionnaire}}$$

In this case, the average of CVI value above 0.7 was considered satisfactory hence, indicating that the instrument satisfies content validity (Kothari, 2011). Reliability indicated the stability of measures administered at different times to the same individuals or using the same standard or the equivalence of sets of items from the same test or of different observers scoring a behaviour or event using the same instrument (Saunders, Lewis & Thornhill, 2009). Reliability test was established using test re-test method. This was by administering the questionnaire to ten purposely sampled respondents. Afterwards, the responses on the instrument was analysed using SPSS and Cronbach's alpha values (Cronbach Alpha Reliability Coefficients) for each of the variables obtained. Cronbach's alpha can take any value from zero (no internal consistency) to one (complete internal consistency). The reliability coefficients value equal to or above 0.7 shows that the instrument is reliable (Kothari, 2011). For this study, the overall Cronbach alpha was 0.782 which indicated that the instrument used in the study was reliable.

Table 2. Reliability test

Variables	Cronbach alpha	No. of items
Awareness creation	0.842	05
Community consultation	0.822	05
Participation in decision	0.786	05
Stakeholder partnership	0.760	05
Waste management	0.702	15
Overall	0.782	35

Source: Primary Data

2.8 **Data presentation and analysis**

The data was coded after which, the Statistical Package for Social Sciences (SPSS), was used to analyse the data collected. Univariate analysis was carried out using descriptive statistic. This was done with the help of percentages, mean, and standard deviation. It helped to test the relative importance of the construct under stakeholder participation and SWM Lira City East

division. Bivariate analysis was carried out as it helps to test the correlation coefficients between independent variables and the dependent variables (Saunders et al, 2009). Pearson correlation analysis was used to measure the correlation between the constructs of stakeholder participation and SWM. Regression analysis was used to assess the effect of stakeholder participation on waste reduction, recycling and reuse. This involved content analysis, which was used to edit qualitative data and reorganize it into meaningful shorter sentences. Thematic approach was used to analyse qualitative data where themes, categories and patterns were identified. The recurrent themes that emerged in relation to each guiding question from the interviews were presented in a narrative form with selected direct responses from participants presented as quotations.

3. Results of the Study

3.1 Demographic characteristics of the respondents

The demographic characteristics of the study participants were studied in terms of gender, age, level of education, type of waste generated, type of waste containers used, frequency of waste collection and who is responsible for collecting waste. The findings are indicated in table 3.

Table 3. Demographic Characteristics

Variable	Frequency	Percent
Gender		
Female	54	42.9
Male	72	57.1
Total	**126**	**100**
Age of the Respondents		
18-20 years	09	07.1
21-40 years	87	69.0
41-50 years	23	18.7
Above 60 years	07	05.6
Total	**126**	**100**
Level of Education		
Certificate	80	63.5
Diploma	32	25.8

Degree	13	10.3
Master & PG diploma	01	0.8
Total	**126**	**100**
Type of solid waste		
Food remains	56	44.4
Metals	03	02.4
Plastics/Polythene	67	53.2
Total	**126**	**100**
Container for waste collection		
Sacks	62	49.2
Plastics bin	57	45.2
Metal bin	07	05.6
Total	**126**	**100**
Frequency of waste collection		
Once a week	66	52.4
Twice a week	45	35.7
Once a month	01	0.8
Twice a month	14	11.1
Total	**126**	**100**
Waste collectors		
Lira city council	41	32.5
Private company	37	29.4
Individuals	48	38.1
Total	**126**	**100**

Source: Primary data, 2022

Table 3 indicates that the majority of respondents were male 72 (57.1%) while minority was female 54 (42.9%). However the finding revealed that there was gender representation in that study. This shows that the finding represented the views of both male and female participants. The findings also indicated that, majority of the respondents 87 (69%) were in the age group of 21-40 years while minority 07 (5.6%) were aged above 60 years. On the level of education, the study revealed that most of the study participants had certificate level of education (63.5%). This suggests that they were in position to interpret the items in the data collection tools. Regarded the type of waste being generated in households, the study revealed that most of the waste generated are polythene/plastics (53.2%) followed by food remains (44.4%). This can be explained by the fact that most people use polythene material as containers for buying and in addition, polythene is the mostly used packing material in shops and markets. The study also revealed that, most households in Lira City East division use plastic (45.2%) and sacks (49.2%) for collecting waste and the waste generated in most of the households are collected once a week (52.4%). Lastly, regarding those responsible for collecting waste, majority of the study participants 48 (38.1%) expressed that they individual manage their waste.

Descriptive statistics on independent variable

Descriptive statistics were used to assess the contribution of stakeholder participation in SWM in Lira City specifically in terms of percentages, means and standard deviation. Stakeholder participation was assessed in terms of their contribution on awareness creation, community consultation, participation in decision making on how to manage waste and stakeholder partnership.

3.2 Participation through Awareness Creation

In order to assess the participation of stakeholder in creation of awareness, respondents were assessed on the five (5) items indicated in table 4.

Table 4. Participation through Awareness creation

Items	N	Mean	SD
Whether there is creation of awareness on how to carry out recycling of domestic waste	126	2.71	1.475
Whether consultations between stakeholders have increased the efficiency of domestic waste management in Lira City East	126	2.52	1.231
Whether Lira City East division organizes stakeholder workshops on domestic waste management	126	2.25	1.171
Whether the City East division council sensitizes residents on proper domestic waste management methods during the stakeholder workshops	126	2.63	1.270

Whether there is always creation of awareness on proper waste separation	126	2.58	1.280
Valid N (listwise)	126	2.54	1.285

Source: Researcher's Contribution using Primary data (2023)

Table 4 reveals that all the items used to assess the level of stakeholder participation in creating awareness to the management of solid waste were below average on a Likert scale of 1-5 used by the researcher. This suggested that the respondents were not in agreement with the items in relation to being implemented to manage solid waste in Lira City division. The overall mean of approximately 2.54 suggested that the respondents were not in agreement with the creation of awareness for stakeholder in the management of solid waste in Lira City East division. The Standard Deviation of 1.285 indicated heterogeneity in the views of the respondents. However, the interview held with the key informants indicated that;

> '*There is sensitization of households to collect waste and take to the waste to the collection centres and also to let the household know that managing waste is a primarily a responsibility of the households. Households have also been encouraged to manage their waste at source by burning them'.* (K01)

3.3 Participation through Community Consultation

In an attempt to assess stakeholder participation in community consultation, respondents were asked questions indicated in table 4.5. The results on the various items are shown in table 5.

Table 5. Participation through Community Consultation

Items	N	Mean	SD
Whether Lira City East division organises citizen consultation meeting to discuss domestic waste management issues	126	2.68	1.198
Whether through consultation, waste collection services in Lira City East is satisfactory	126	2.59	1.182
Whether appropriate waste storage techniques are employed by stakeholders through consultations	126	2.72	1.150
Whether there are adequate consultations among stakeholders on how to handle domestic wastes in the division	126	2.59	1.075
Whether there are meaningful consultations among stakeholders on the appropriate domestic waste management practices	126	2.60	1.160
Valid N (listwise)	126	2.64	1.153

Source: Researcher's Contribution using Primary data (2023)

Table 5 reveals that all the items used to assess the level of stakeholder participation in community consultation was below average on a Likert scale of 1-5 used by the researcher. This suggested that the respondents were not in agreement with the items in relation to their implementation to manage solid waste in Lira City division. The overall mean of 2.64 implied that the respondents were not in agreement on the level of community consultation by stakeholder in the management of solid waste in Lira City East division. The standard deviation of 1.153 indicated heterogeneity in the views of the respondents. Qualitative finding from key informants revealed that;

> '*City east division conducted meetings at Lira main market and another community meeting at Bazzar West and a general cleanness exercise was conducted in the area*'. (KI02)

However another key informants revealed that;

> '*There is still minimal stakeholders engagement meeting and so far only conducted one in Bazar West'*. (KI03)

 3.4 Participation through Decision making

In order to assess the level of stakeholder participation in decision making, respondents were assessed on the five (5) items indicated in table 6.

Table 6. Participation through Decision making

Items	N	Mean	Std. Dev
Whether stakeholder engagements on how to manage wastes are carried out frequently	126	2.60	1.220
Whether participatory decision making makes waste collectors to adhere to the designated days for waste collection	126	3.05	1.130
Whether designated waste collection points are provided through stakeholder participation	126	3.04	1.280
Whether all the relevant stakeholders always participate in decision making on how to manage domestic waste in the city	126	2.73	1.176
Whether domestic waste management surveys are always carried out in Lira City East	126	2.78	1.385
Valid N (listwise)	126	2.84	1.355

Source: Researcher's Contribution using Primary data (2023)

The descriptive statistics in Table 6 revealed that most of the items used to assess the level of stakeholder participation in decision making was below average on a Likert scale of 1-5 used by the researcher. This suggested that the respondents were not in agreement with most of the items in relation to their participation in decision making in Lira City division. The result only revealed that there are designated waste collection points (Mean of 3.04) and that participatory decision making makes waste collectors to adhere to their waste collection days (Mean of 3.05). The overall mean of 2.84 implied that the respondents were not in agreement on the level of participation in decision making by stakeholders in Lira City East division. The standard deviation of 1.355 indicated divergent views of the respondents. The qualitative finding from the key informants revealed that;

> '*The division plans to contract out garbage management to private companies. Already piloting is being done. The division also plans to procure garbage trucks to aid in collecting garbage and transporting it to Aler Compost site'.* (KI04)

3.5 Participation through Stakeholder Partnership

In order to assess the level of stakeholder participation in partnership, respondents were assessed on the five (5) items. The result is indicated in Table 7.

Table 7: Participation through Stakeholder Partnership

Items	N	Mean	Std. Dev
Whether there is adequate dialogue among stakeholders on how to manage domestic waste	126	2.59	1.083
Whether stakeholder partnerships have improved domestic waste management	126	3.02	1.200
Whether Lira City East always hold partner meetings with between residents and land lords/ladies	126	2.50	1.218
Whether designated waste collection points are provided through stakeholder partnerships	126	2.79	1.310
Whether tenant meetings improve the domestic waste management practices of residents and business owners	126	3.02	1.265
Valid N (listwise)	126	2.78	1.215

Source: Primary Data, 2023

The descriptive statistics in table 7 revealed that most of the items used to assess the level of partnership among stakeholders in Lira City East division were below average on a Likert scale of 1-5 used by the researcher. This suggested that the respondents were not in agreement with the items in relation to their use to manage solid waste in Lira City division. However, it

indicates that stakeholder partnership has improved (Mean of 3.02) and that tenant meeting improves waste management (Mean of 3.02). The overall mean of 2.78 implied that the respondents were not in agreement on the level of partnership by stakeholder in Lira City East division. The standard deviation of 1.215 indicated heterogeneity in the views of the respondents in regard to stakeholder partnership. However, the qualitative finding from the key informants (KI05) revealed that Lira City East division entered into a partnership with private service providers in the names of Alliance water solutions and R&C clean world to help in the management of waste.

Descriptive statistics on the dependent variable

Descriptive statistics was also used to assess the construct under SWM in terms of percentages, means and standard deviation. SWM was assessed in terms of waste reduction, waste recycling and waste reuse. In order to assess the practice of solid waste reduction, respondents were assessed on the five (5) items. The result is indicated in Table 8.

Table 8. Descriptive Statistics

Items	N	Mean	Std. Dev
I always minimize bringing waste materials at home	126	4.02	.988
All the waste material are immediately disposed off	126	4.00	1.180
There is a measure in place to minimize the amount of waste at home	126	3.52	1.231
Reducing amount of waste generated at home here is the responsibility of everybody	126	3.88	1.378
Waste reduction is the main strategy of managing waste here	126	3.90	.889
Valid N (listwise)	**126**	**3.86**	**1.133**

The descriptive statistics in table 8 revealed that all the items used to assess the level of waste reduction practice as a strategy of managing solid waste in Lira City East division were above average on a Likert scale of 1-5 used by the researcher. This suggested that the respondents were in agreement with the items used to assess waste reduction strategy in managing solid waste in Lira City division. The overall mean of 3.86 implied that the respondents were in agreement on the practice of waste reduction in management of solid waste in Lira City East division. The standard deviation of 1.133 indicated heterogeneity in the views of the respondents in regard to waste reduction practice in Lira City East division.

The qualitative finding from the interview held with the key informants revealed that;

'as a strategy of waste reduction, Waste is transported from the different collection points at the city and it is then sheaved at the composite site, separation of polythene, plastics and manure is done there'. (KI04)

However, the key informants reported poor mind-set of communities in relations to garbage management, high cost of garbage management. for example, each of the 70 garbage scouts are paid shillings 200,000 monthly, high tons of garbage generated from the central business district as some of the challenges in waste reduction.

In order to assess the level of solid waste recycling, respondents were assessed on the five (5) items. The result is indicated in table 9.

Table 9: Descriptive Statistics for Waste Recycling

Items	N	Mean	SD
Some of the domestic waste generated are recycled	126	3.67	1.391
There are people who collect the waste that can be recycled	125	4.16	1.073
There is a specific place for storing waste that can be recycled	126	3.06	1.509
There are specific days that waste that can be recycled are always collected	126	2.64	1.293
Waste recycling in the main way of managing waste here	126	3.48	1.250
Valid N (listwise)	**125**	**3.40**	**1.303**

The descriptive statistics in table 9 revealed that most of the items used to assess the level of waste recycling in Lira City East division were above average on a Likert scale of 1-5 used by the researcher. This suggested that the respondents were in agreement with the items in relation to assess the level of waste recycling in Lira City division. However, the finding only disagreed on the specific days of collecting waste for recycling (Mean of 2.64). This probably means that those who are into waste recycling only collect them when they have accumulated enough. The overall mean of 3.40 implied that the respondents were in agreement on the practice of waste recycling to manage solid waste in Lira City East division. The standard deviation of 1.303 indicated heterogeneity in he views of the respondents in regard to the application of waste recycling practices in the management of solid waste in Lira City East division. In order to assess the level of solid waste reuse, respondents were assessed on the five (5) items. The result is indicated in Table 10.

Table 10. Descriptive Statistics

Items	N	Mean	SD

Some of the waste here are put to alternative use	126	3.64	1.196
Reusable waste are always separated from non-reusable	126	2.82	1.530
Some domestic waste like kitchen refuse are used as animal feeds	126	3.60	1.207
Some domestic wastes generated are decomposed to make fertilizers	126	3.20	1.403
Waste reuse is the main way of managing waste here	126	3.50	1.144
Valid N (listwise)	**126**	**3.35**	**1.296**

The descriptive statistics in Table 10 revealed that all the items used to assess the level of waste reuse in Lira City East division were above average on a Likert scale of 1-5 used by the researcher. This suggested that the respondents were in agreement with the items in relation to their use to manage solid waste in Lira City division. However, the result indicated that the practice of waste separated was below average (Mean of 2.82). This indicated that most household disposed all forms of waste together. The overall mean of 3.35 implied that the respondents were in agreement on the practice of waste reuse in Lira City East division. The standard deviation of 1.296 indicated heterogeneity in the views of the respondents in regard to waste reuse in Lira City East division.

Correlation between stakeholder participation and swm

In order to test the relationship between stakeholder participation and SWM, a correlation analysis was run. The results are presented in Table 11.

Table 11. Pearson's Correlation Results

		SP	WRD	WRC	WRU
Stakeholder participation (SP)	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	126			
Waste reduction (WRD)	Pearson Correlation	.326[**]	1		
	Sig. (2-tailed)	.000			
	N	126	126		

Waste recycling (WRC)	Pearson Correlation	.467**	.008	1	
	Sig. (2-tailed)	.000	.925		
	N	126	126	126	
Waste reuse (WRU)	Pearson Correlation	.490**	.281**	.699**	1
	Sig. (2-tailed)	.000	.001	.000	
	N	126	126	126	126

**. Correlation is significant at the 0.01 level (2-tailed).

Results of Pearson's correlation analysis presented in Table 11 shows that there existed a positive and significant correlation between SWM and stakeholder participation in Lira City East division (at 99% confidence level). The study established that stakeholder participation was moderately and significantly correlated with waste recycling (r=0.467, P<0.01) and waste reuse (r=0.490, P<.01). According to the results, a unit increase in the scores of stakeholder participation results to improved waste recycling and waste reuse by 0.467 and 0.490 units respectively. The results also revealed a weak significant relationship between stakeholder participation and waste reuse (r=0.326) significant at 0.01 (P<0.01). This suggested that an increase in the score of stakeholder participation would result to increase in the score of waste reduction by 0.326 units.

Regression analysis on stakeholder participation and SWM

This section presents a finding of the empirical results of the regression analysis. In order to answer the three research objectives of the study and answer the three research questions, a linear regression was run. The results on each of the three research questions and the regression analysis are explained and discussed.

3.6 Empirical results on Stakeholder Participation and Waste Reduction

In order to achieve objective 1 and answer the first research question, a linear regression analysis was carried out. The results of the linear regression are indicated in Table 12.

Table 12. Model Summary for Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.326a	.106	.099	.78311

a. Predictors: (Constant), Stakeholder Participation,

b. Dependent Variable: Solid waste reduction

The model summary of the regression test in Table 4.2 produced an Adjusted R Square of .099, which meant that stakeholder participation contributed about 09.9% to solid waste reduction in Lira City. This implies that awareness creation has a significant contribution to the management of solid waste in Lira City. The remaining 90.1% was contributed by other factors. The coefficient of the regression was also determined in this study and the results are shown in Table 13.

Table 13. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.961	.245		12.067	.000
	Stakeholder participation	.335	.087	.326	3.844	.000

a. Dependent Variable: Solid waste reduction

The finding in table 13 indicated that stakeholder participation had a regression coefficient of 0.335 which is significant at 1% level of confidence. This indicated that stakeholder participation had a significant effect on the solid waste reduction in Lira City. From the finding, it implies that a unit increase in the score of stakeholder participation increases the score in solid waste reduction by 0.335 units. This result answers the first research question which was asking the contribution of stakeholder participation in the management of solid waste in Lira City.

This result is in support of the qualitative of the key informants in the interview held. The interview held with the key informants indicated that;

'The division has recruited garbage scouts who are responsible for collecting garbage at household level and taking them to the garbage collection centre points.in addition, The division have procured garbage skips (Containers) to be installed in different places, the division has also entered in to Partnership with service providers e.g. Alliance water solution and R&C water world. The role of partners is to reach to every household and collect garbage and take to Aler Composite plant'. (KI05)

Another interview held with the key informants indicated that;

'The division is Piloting private companies to manage solid waste in the division (This Company is expected to register all households and collect garbage from them at a fee)'. (KI03)

In another interview held with the key informants, the result indicated that;

'There is sensitization of households to collect waste and take to the waste to collection centres and also to let the household know that managing waste is a

primarily a responsibility of the households. Also, households have also been encouraged to manage their waste at source by burning them'. (KI01)

In another interview held with the key informants, the result indicated that;

'*Waste is transported from the different collection points at the city and it I then sieved at the composite site, separation of polythene, plastics and manure is done there'.* (KI05)

The finding is consistent with that of Kotei, Annang, and Yirenya-Tawiah (2020) who assessed the participation of identified stakeholders in SWM (SWM) in Ga West Municipality in Ghana and found that stakeholder participation had a significant effect on solid waste reduction. The finding also concurs with that of Vutivoradit and Jakkapattarawong (2018) who studied the contribution of stakeholder participation for sustainable waste management in Pranakorn district Bangkok, Thailand. Their finding was that inadequate environmental sanitation in many cities was as a result of the participation of the stakeholders in waste reduction. The finding also agrees with Sinthumule & Mkumbuzi, (2019) who studied the effect stake participation on community- based SWM in Zimbabwe. The finding of that study revealed that through community meetings were found to be given low-priority for the community members and the county council resolved to use meetings for awareness campaigns to enhance solid waste reduction in the community. The finding also supports a study by Njuguna (2016) who carried out on the contribution of stakeholder participation in the management of solid waste in Gitambaya, Kenya. That study established that community participation in domestic waste reduction in Gitambaya, as practiced by households and business operators was limited. In order to answer objective 2 of this study stated in Chapter One, and the second research question which was asking the contribution of stakeholder participation on waste recycling in Lira City East Division, a simple linear regression analysis. The results from the simple linear regression are shown in table 14.

Table 14. Model Summary for Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.467[a]	.218	.212	.93248

a. Predictors: (Constant), Stakeholder participation

The model summary regression results in table 18 shows an Adjusted R Square of .212 which implies that about 21.2% of the variations in solid waste recycling in Lira City East division can be explained by stakeholder participation. The finding therefore indicates that stakeholder participation contribute significantly to solid waste reduction in Lira City East division.

Finally, a t-test for stakeholder participation and solid waste recycling was also performed and the results are shown in Table 15.

Table 15. Coefficients of regression

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.751	.292		5.992	.000
Stakeholder participation	.611	.104	.467	5.884	.000

a. Dependent Variable: Solid waste recycling

The finding in table 15 indicated that stakeholder participation had a regression coefficient of 0.611 which is significant at 1% level of confidence. This indicated that stakeholder participation had a significant effect on solid waste recycling in Lira City East division. From the finding, it implies that a unit increase in the score of stakeholder participation increases the score in solid waste recycling by 0.611 units. This result therefore answers the second research question which was asking the contribution of stakeholder participation on solid waste recycling in Lira City East division.

This result is in support of the qualitative of the key informants in the interview held. The interview held with the key informants indicated that;

> 'Our City has about five partners collecting garbage at household level. Global Livingstone, Mukwano, Johnwire are some of the private companies implementing waste management strategies in the City. They buy plastic wastes for recycling'. (KI03)

The finding agrees with that of Ndururi, Muriithi and Ochola (2019) who established the influence of stakeholder participation strategies on domestic waste management in Biashara residential area in Kenya. The study realised that there was a statistically significant positive correlation between the various stakeholder participation strategies and improved domestic waste recycling. The finding is also in line with that of Eun (2016) who assessed the effect of stakeholder participation on waste recycling in Ulsan Northern District of Japan. The result of the study revealed that stakeholder participation had a significant role on waste recycling. The result of the study supports that of Klunbut et al (2017) carried out a study on the contribution of stakeholder participation in SWM through waste recycling in Thailand. The finding of the study indicated that stakeholders play a very instrumental role in waste management by way of encourage the local community to do waste recycling. The finding also concurs with Saat, Hanawi, Subhi, Zulfakar, Wahab (2018) investigated the role of stakeholder strategies in the management of solid waste in Uganda in which the result indicated that stakeholder participation significantly affect solid waste recycling. In order to answer the third objective of the study and the third research question which was on the effect of stakeholder participation on solid waste reuse in Lira City East division, a simple linear regression was run. The results from the model summary of regression are shown in Table 16.

Table 16. Model Summary for Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.490[a]	.240	.234	.84653

a. Predictors: (Constant), Stakeholder participation

As shown in Table 16, the model summary of the regression test produced an Adjusted R Square of 0.234, which meant that stakeholder participation contributed about 23.4% to solid waste reuse in Lira City East division. The remaining 76.6% was contributed by other factors. The finding therefore implies that stakeholder participation has a significant contribution on solid waste reuse in households in Lira City. Furthermore, a t-test was carried to draw out the statistical significance between stakeholder participation and solid waste reuse. The results are shown in table 17.

Table 17. Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.762	.265		6.641	.000
Stakeholder participation	.590	.094	.490	6.257	.000

a. Dependent Variable: SWM

The finding in table 17 indicated that stakeholder participation had a regression coefficient of 0.590 which is significant at 1% level of confidence. This indicated that stakeholder participation had a significant effect on solid waste reuse in households in Lira City East division. From the finding, it implies that a unit increase in the score of stakeholder participation increases the score in SWM by 0.590 units. This finding therefore answers the third and the last research question which was on the contribution of stakeholder participation on solid waste reuse in households in Lira City East division.

This result is in support of the qualitative of the key informants in the interview held. The interview held with the key informants indicated that;

> *'we always encourage people not to throw away material like polythene bags that are usually given to them from the shop but to rather keep them and use again when they are going to the shop or market to buy goods'.* (KI01)

The interview held with the key informants indicated that;

> *'Through Community Baraza and sanitation week, the local community are sensitised to always reuse some of the materials especially polythene bags or plastic containers that the shop attendants always packs for them goods when they go to the shop*

because most of them are always disposed when they are still in good condition'. (KI05)

The finding is consistent with those of Abas et al. (2020) who assessed the role of stakeholders in the management of solid waste in the rural area of Kelantan in Malaysia. The study found that the SWM was considered inefficient due to a lack of knowledge in proper waste handling and the reuse of waste. The finding also agrees with Saat, Hanawi, Subhi, Zulfakar, and Wahab (2018) who studied the private sector participation in waste reuse and recycling in Kenya. The study also found that even where solid waste laws and by-laws are in place, lack of enforcement will from stakeholders made people to violate many of the laws, especially those on reuse and disposal, and their participation was unplanned, and open to unhealthy competition in their operations. The finding is also in support of Enugu (2018) who studied the contribution of stakeholders in the management of solid waste in south east Nigeria. His study revealed that the contributions of the stakeholders in the sector to the SWM system is huge due to sorting re-usable and recyclable materials from mounds of trash in dumpsites and converting the wastes to wealth. The finding also concurs with Manaf, MAA and NIM (2018) studied the participation of households in 59 selected cities in India to understand why solid ruse as a strategy of managing solid waste was failing. Their study also revealed that stakeholder participation helps in enhancing waste management through waste reduction.

Multiple regressions on stakeholder participation and SWM

To achieve the purpose of this study which was to examine the effect of stakeholder participation on SWM in Lira City, the researcher carried out multivariate regression analysis and the findings are presented in table 18.

Table 18. Model Summary for Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.512[a]	.346	.326	.58703

a. **Predictors**: *(Constant), Stakeholder participation (creation of awareness, community consultation, decision making and stakeholder partnership)*

b. **Dependent Variables**: *Waste reduction, waste recycling and waste reuse*

The results presented in Table 18 revealed that stakeholder participation significantly affect the variance in SWM by 32.6% (Adjusted R^2=0.326, p<0.01). This implies that creation of awareness, community consultation, decision making and stakeholder partnership account for 32.4% variation in the management of solid waste in Lira City. The finding concurs with Waithera (2019) who examined the influence of influence of stakeholder participation on domestic waste management in Biashara Residential Area, Kiambu County, Kenya. The finding of the study indicated that participation of stakeholders in SWM had a significant effect on the management of solid waste. Similarly, Ndururi, Muriithi and Ochola (2019) in a study on the effect of stakeholders, participation in SWM revealed that stakeholder participation had a significant effect on the management of solid waste. Also, a study by Sinthumule and

Mkumbuzi, (2019) on the contribution of community participation in waste management found that community participation plays a significant role in waste management. Relatedly, a study by Singh and Dey (2015) in Manipur, India on stakeholder participation in waste management revealed that NGOs help to collaborate with the public, and CBOs to ensure public involvement in meetings with local resident welfare associations.

4. Conclusion of the study

The purpose of this study was to examine the contribution of stakeholder participation on SWM among households in Lira City East division. The study was both quantitative and qualitative in nature and employed cross-sectional research design. Data was collected with the help of questionnaires, and interview guide while analysis of the data collected was done with the help of SPSS version 23 where correlation and linear regression were made use of. Stakeholder participation through creation of awareness, community consultation, decision making can help in the reduction of the quantity of waste in the environment of Lira City West division. Stakeholder participation through creation of awareness, community consultation, decision making can help in the management of solid waste in the household of residents of Lira City East division. Stakeholder participation through awareness, community consultation, decision making and partnership with other stakeholders can be reuse can help in the management of solid waste in the household of residents of Lira City East division.

5. Recommendations of the study

Based on the conclusions of the study, the researcher made the following recommendation.

a) More awareness creation be offered to the local community on all the aspects of domestic waste management to enable them play their rightful role in domestic waste management.

b) Dialogue, consultations and partnerships between the residents and those in charge of waste management in Lira City East division should be held on various aspects of the SWM process.

c) There should be an increase in the number of stakeholder forums to address the inadequacy in the management of solid waste.

d) Stakeholder surveys, meetings and workshops should be embraced in the SWM process and the suitable solutions be encourage to come from the residents themselves as they know their problems better.

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