

COMMUNITY PARTICIPATION IN COLLECTION AND TRANSPORTATION OF SOLID WASTE IN KENYA: CASE OF LANGAS ESTATE IN ELDORET TOWN

Cheruiyot Stephen Kiplimo

Kisii University, P.o Box7, Moiben,

Email: Cheruiyotsteve18@yahoo.com

Abstract: The study sought to establish community participation in collection and transportation of solid wastes in Langas Estate, Eldoret Town. The study adopted descriptive survey design. The target population for the study consisted of 416 households in Langas estates, county government officers, NEMA officials and local area chief. The Sampling techniques to be employed in this study was systematic random sampling and purposive sampling techniques. Purposive sampling was used to select 2 staff of NEMA, 5 county government employees and local area chief and 191 residents. Questionnaire and interviews were the main instruments of data collection. The data was analyzed using descriptive statistics. The study established that there are inefficiencies in household waste collection by the County government. Community members were more involved with household waste collection. The main household waste collectors were self-help groups. The households were paying for waste management services offered by individuals or groups. Failure by some households to pay for waste management services to stakeholder may lead to withholding of the waste management services by the concerned leading to inefficiencies in waste management. Domestic solid wastes were not collected on daily basis, this implies that there was piling of wastes in the study area. The study recommended that there is need to separation of household wastes at the source to allow for efficient management of household wastes and also investing in efficient transportation of the stored wastes without delay to avoid heaps of household wastes at the storage areas.

Keywords: Community participation, Collection and transportation, Solid waste.

1. INTRODUCTION

Waste generation in both domestic and industrial continues to increase world-wide due to growth in consumption patterns. With increase in populations and living standards the solid waste generation in developing countries has rapidly increased (UNEP 2005). In America, many communities, businesses, and individuals have found creative ways to reduce and better manage Municipal Solid Waste (MSW) more commonly known as trash or garbage - through a coordinated mix of practices that includes source reduction, recycling (including composting), and disposal. The most environmentally sound management of MSW is achieved when these approaches are implemented in this order: source reduction first, recycling and composting second, and disposal in landfills or waste combustors last (EPA, 2007).

In Africa growing number of cities face challenges of providing their populations with adequate water supply, sanitation and solid waste services, because of the rapid rate of the urbanization process. United Nations projections estimate that the urbanization rate will increase from 24% in 2005 to 38% by 2030, with more than 20 million Tanzanians living in urban areas (United Nations, 2006). The fast-increasing amounts of waste have to be processed, while in Africa, the management capacities available for this purpose are often poor and inadequate, especially in low-income areas. Most

municipal authorities in developing countries have failed to provide their expanding populations with adequate services for managing solid waste as well as for providing water and sanitation (Abduli, 2007).

In Mauritius, no household is provided with a regular daily waste collection service (Heeramun, 2013). In the past, very few storage receptacles were in use on domestic premises, the waste being simply heaped on the ground or in open concrete ash pits. Focus on waste collection a study by Tchobanoglous et al., (2013), uncovers domestic waste collection at household level as slow and labour intensive because of inadequate storage and large amounts of leaves and garden waste. Studies show that in most parts of Namibia, a significant proportion of municipal waste in rural areas is burnt in back yards (Longwe, 2012). Solid wastes in Botswana have traditionally been collected by local authorities, but during the last three years, however, the Ministry of Local Government has entrusted some of the collection function to private contractors (Patel, 2012). It has been reported that in other parts of the cities in developing Sub-Saharan nations, waste collection and disposal are left to individuals or local communities or waste is left to accumulate in the streets (Vigil, 2012).

Kenya is facing a serious challenge in household solid waste management due to unprecedented rates of urbanization whereby massive migratory movement to urban areas thereby causing low quality of housing. The lack of basic infrastructure especially sanitation is precursor to the proliferation of solid wastes (Muriuki, 2009). Community participation in household solid management yield health and social benefit. This is achieved through partnership between the community, the county government and other stakeholders. For instance, neighbourhood communities, community based organizations and enterprises engaging in collection and disposal of waste material (World Bank, 2003).

In Eldoret town which is among the fast-growing urban centers in Kenya, the proliferation of household solid waste has increased than other towns such as Kisumu, Nakuru due to increase of human settlements around the town (Nyabeda & Kipkorir, 2010). Uasin Gishu County Government have failed to put in place mechanisms to mitigate the problem of waste collection and disposal in Eldoret town. Moreover, Langas Estate of Eldoret has not been left behind as household solid waste management has become serious problem due to lack of collection and disposal systems these is evident in Panama, Kambi Nguruwe and Kauruko within Langas Estate. The solid waste is disposed on roadsides, pathways and open fields. This study focused on community participation in household solid waste management in Langas Estate of Eldoret in Uasin-Gishu County. It is within this frame work that there was need for involvement of the householders in different estates in Langas Estate as a key factor to the success of household solid waste management in Langas Estate.

Statement of the problem

Efficient waste management in Kenya is currently hampered by a number of factors such as; inefficiency and limited capacity of the urban management authorities; limited involvement of stakeholders including the local community, Community Based Organizations, NGOs and churches; and low-income levels especially in the slum areas (JICA, 2008). The informal settlement in Eldoret is characterized by huge open dumpsites and blocked sewers which are a health hazard to the residents. Un-attended municipal solid waste poses health risks to the area residents such as water borne diseases that results to high mortality rates among children (APHRC, 2002). Hence, the role of community participation in household solid management has not be addressed.

2. LITERATURE REVIEW

Community Participation in Waste Management

Garity (2015) discusses community participation as the process by which individuals and families assume responsibility for their own health and welfare and for those of community and develop the capacity to contribute to theirs and the community development. He eludes that they come to know their own situation better and are motivated to solve their common problems. This enables the community to become agents of their own development instead of positive beneficiaries of development aid. Subash (2016) recognizes community participation as the sociological process by which residents organize themselves and become involved at the level of a living area or a neighbourhood, to improve the conditions of daily life (water, sanitation, health and education. The concept community participation comprises of three pertinent aspects, that is, awareness, mobilization and action. Awareness of the community raises a sense of ownership within the community, thus sustainable solid waste management is achieved (Chiwandamira, 2010).

According to Chapman (2013), the term community participation, rather than consultation, indicates an active role for the community, leading to significant control over decisions. She further states that the two key rationales for community participation are that it is ethical and pragmatic. According to Khan (2006), performance of effective and efficient solid waste management systems depends on the meaningful participation of individuals, communities and institutions, producers, non-governmental organizations and governments. In relation to the above statement, analysing the data, Chimhowu (2012) notes that the operational efficiency of solid waste management depends upon the active participation of both the municipal agency and the citizens. Linkages of the public and private sector operators may improve the efficiency of the solid waste management and create new opportunities for employment (Tevera, *et al.*, 2002).

Recognizing the importance of community participation in waste management projects and programmes is a key factor for their success. Community involvement in the planning and implementation of projects or programmes is a complex proposition. However, the benefits of wide stakeholder involvement include a clear impression of the problem to be tackled, a clear idea of the possible solutions including perspectives on affordability and desirability and finally the possibility of generating both public consensus and commitment to the project (Marine and Fawcett, 2006).

Most cities in developing countries face urban environmental problems and these are partly caused by inadequate provision of basic services such as water supply, sanitation facilities, transport infrastructure and waste collection. Due to a lack of financial, human and technical resources, municipalities are not able (or willing) to provide basic services to all neighbourhoods within their city; especially the poor neighbourhoods are deprived of basic services. The scenario would be different in informal settlement area if the stakeholders were involved and if the residents' capacity on solid waste management was enhanced in the light of reducing, recycling and reusing the solid waste generated at the household level. Many projects have been set up to deliver basic services to these low-income areas and other areas that do not have services. In order for these projects to succeed and have a lasting impact, community participation is essential. Community participation is a process in which community members are involved at different stages and degrees of intensity in the project cycle with the objective to build the capacity of the community to maintain services created during the project after the facilitating organizations have left (Muller *et al.*, 2000).

3. METHODOLOGY

Research Design

This study employed a descriptive survey design. Descriptive research design involves gathering data that describe events, then organize, tabulates, depicts and describes events data collections.

The choice of the research design was influenced by the nature of the objectives of this study. This was appropriate as it gave a detailed description of the role of community participation in household waste management in Langas Estate in Uasin Gishu County.

Area of study

The study was carried out in Langas estate of Eldoret town in Uasin Gishu County. The estate is very extensive area and it has been sub-divided into blocks hence the researcher focused on Panama, Kambi Nguruwe and Kauruko estates. This was due to the fact the area as challenges of household waste management and inhabited by low income residents who are inefficient to manage wastes.

Target Population

The target population for the study consisted of 416 households in Langas estates, county government officers, NEMA officials and local area chief.

Sample Size and Sampling Procedures

Purposive sampling was used to select county government officials NEMA officials and local area chief, while simple random sampling was used to select households in the study area.

Sample Size

The sample size formula for this study is based on Krejcie and Morgan (1970) as quoted by Kasomo (2001). The formula is given as:

$$n = \frac{X^2 * N * P(1 - P)}{(ME^2 * (N - 1)) + (X^2 * P * (1 - P))}$$

Where

n=Sample size

X^2 =Chi Square for the specified confidence level at 1 degree of freedom = (3.841) from tables

N=Population size

P=Population proportion (.50 in the table)

ME=Desired margin of error (expressed as a proportion=0.05)

$$= 3.841 \times 416 \times 0.5 (1-0.5) / 0.05 \times 0.05 (416-1) + 3.841 \times 0.5 (1-0.5)$$

$$= 399.464 / 1.99775$$

$$= 199$$

The Sampling techniques to be employed in this study was systematic random sampling and purposive sampling techniques. Purposive sampling was used to select 2 staff of NEMA, 5 county government employees and local area chief and 191 residents.

4. DATA COLLECTION INSTRUMENTS

The instruments of data collection included questionnaires, interviews, observation and photography.

Questionnaires

Questionnaires were the main tool used to collect data from household heads. According to Kothari (2008), questionnaires are usually free from the interview bias as the answers are in respondent's own words. Respondents also have adequate time to give well thought out answers. Questionnaires also save time and information can be collected from a very large sample. The questionnaire choice is therefore based on the fact that questionnaires are free from bias of the interviewer and respondents have adequate time to give well thought out answers, and is appropriate for literate, educated and co-operative respondents where in this case all respondents of the study were considered to meet this requirement. The questionnaires were developed on the basis of the objectives of the study and variables as captured in the literature review. The questionnaires consisted of closed ended questions and open-ended questions. The closed ended questions from the questionnaire generated quantitative data.

Interview Schedules

Orodho (2009) postulates that many people are willing to communicate orally than in writing and they would provide data more readily and fully than on a questionnaire. In this case, structured interview was administered to County staff in charge of waste management, members of the NEMA dealing with waste management in the study area and members of the provincial administration. The researcher used interview schedules to get in-depth information from the key informants and enabled the researcher to adapt the questions as necessary, clarify doubts and ensure that the responses were properly understood, by repeating or rephrasing the questions. Interview schedules generated qualitative data on community participation in household solid waste management.

Data Analysis

After the data collection, the researcher cross examined the data to ascertain accuracy, completeness and uniformity. Descriptive statistics such as frequencies, pie charts and percentages were used to analyse the quantitative data while the qualitative was arranged into themes and analysed in narrative form. The qualitative data was logically arranged in themes and in prose. The researcher presented the data in frequencies percentage tables and pie charts to answer the research effectiveness and questions in relation to the research topics. The researcher applied the use of statistical package for social sciences (SPSS) computer generated software to analyze data.

5. FINDINGS

Collection and Transportation of Solid Waste

The objective of this study was to examine the collection and transportation of solid waste in Langas Estate in Eldoret Town. To achieve this objective, the respondents were asked to indicate in the questionnaire whether there were waste collectors in the study area. The results of the analyzed data are presented in Figure 1.

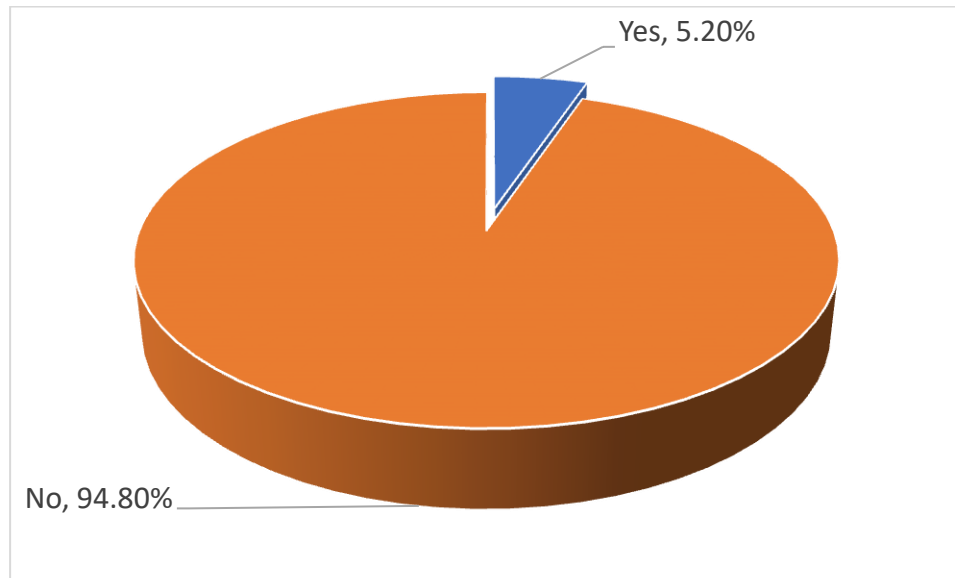


Figure 1: Presence of Waste Collectors

Figure 1 shows that 164(94.8%) respondents reported that there were no waste collectors in the study area while 9(5.2%) respondents noted that there were waste collectors in the study area. From the responses, it emerged that majority (94.8%) of the respondents reported that in Langas, there were no household waste collectors. This shows that there are inefficiencies in household waste collection. Manira (2012) pointed out that community participation is considered important because it is believed that the involvement of the community in an activity like waste management helps them decide about their life and the issues that affect their daily life. It is also believed that community participation gives efficiency and effectiveness to the work.

The respondents who indicated that there were waste collectors in the study area were asked to indicate the persons who were responsible for collection of household wastes.

The results of the analyzed data are presented in Table 1.

Table 1: Persons Responsible for Household Waste Collection

Persons Responsible	Frequency	Percent
County Government	44	26.8
Private firms	20	12.2
CBOs	30	18.3
Self-help groups	51	31.1
Household/community members	19	11.6
Total	164	100.0

Table 1, shows that 51(31.1%) respondents reported that self-help groups were more involved with household waste collection, 44(26.8%) respondents noted that the county government was involved with household waste collection, 30(18.3%) respondents cited that CBOs were involved in collection of household wastes and 20(12.2%) respondents reported that private firms were involved in household waste collection while 19(11.6%) respondents cited that Household/community members were more involved with household waste collection. From the results, it emerged that the main household waste collectors were self-help groups. In a study carried out by Kurian (2016), it was noted that the

community and its representatives have a direct interest in solid waste management, as residents, service users and tax payers. These communities will sometimes take the initiative to organize themselves into community based organizations, with the direct goal of self-help and improving their living conditions. According to Ahmed (2014), community based organizations may also take a role in the actual provision of services, including operations and maintenance and even in the construction of facilities. Thus, community based organizations, speaking for the individuals or members involved, play an important role in solid waste management system development processes. Organized communities have a stronger voice than individuals and bring about improvements more easily. They can also be organized along lines of gender, age or religion (Moghadam *et al*, 2009).

In addition, the respondents were asked to indicate whether or not they were paying for the services offered by the waste management persons or organizations. The findings showed that majority (64.2%) respondents acknowledged that they were paying for waste management services offered by individuals or companies while 30.6% of the respondents were not paying for the waste management services as shown in Figure 2.

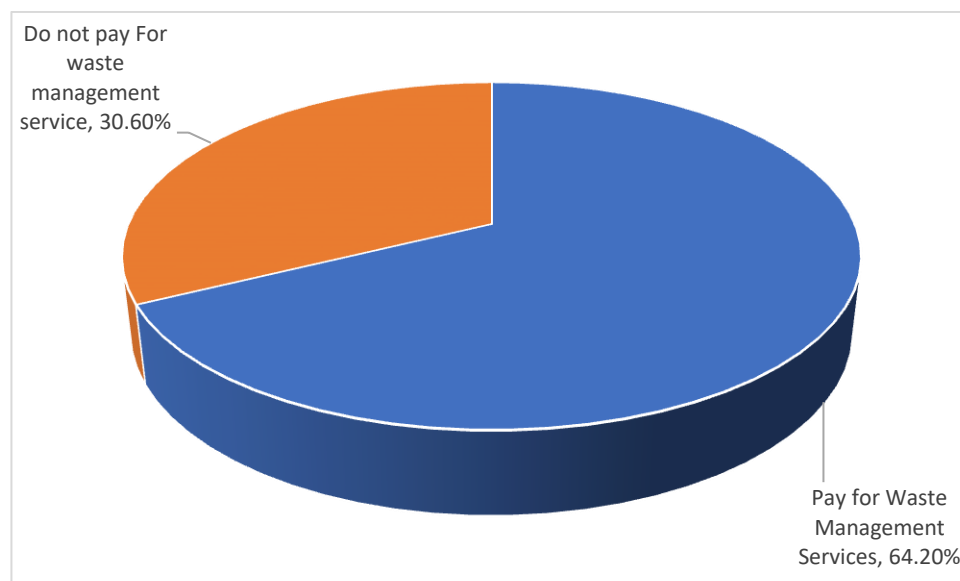


Figure 2: Payment of Waste Management Services

The above findings are in agreement with those of Sharholy, (2007) who pointed out that payment of service charges by individual's results to sustainable solid waste management. The cost of waste management services varied as shown in Table 2.

Table 2: Cost of Waste Management Services

Cost	Frequency	Valid Percent
100-200	39	34.2
201-400	61	53.5
over 400	14	12.3
Total	114	100.0

Table 2, shows that majority (53.5%) of the households were paying between Kshs 201 – 400 for waste management services and 34.2% of the respondents were paying 100-200kshs while 12.3% respondents paid over 400shs per month for waste management services. This implies that failure by some households to pay for waste management services to stakeholder may lead to withholding of the waste management services by the concerned leading to inefficiencies in waste management. Evans (2012) concurs with the above, noting that due to inefficient collection of waste disposal fees from residents, municipalities are compelled to sometimes cut the collection service and reduce its labour force, especially in high density suburbs.

Similarly, the respondents were asked to indicate the frequency of domestic solid waste collection by the service providers. The results of the analyzed data are presented in Table 2.

Table 3: Frequency of Household solid waste collection

Frequency of Collection	Frequency	Percentages
Daily	22	15.2
Once weekly	36	24.8
Twice weekly	5	3.4
once a month	25	17.2
Twice a month	32	22.1
No collection	25	17.2
Total	145	100.0

Table 3 shows that 24.8% of the respondents acknowledged that household wastes were collected once a week, 22.1% respondents reported that household wastes were collected twice a month, 17.2% respondents cited that the waste collectors collected wastes once a month. From the results, it can be shown that domestic solid wastes were not collected on daily basis. This implies that there was piling of wastes in the study area. This study finding were found to be similar to those of Heeramun, (2013) where they found that in Mauritius, no household is provided with a regular daily waste collection service. In the past, very few storage receptacles were in use on domestic premises, the waste being simply heaped on the ground or in open concrete ash pits. Focus on waste collection by Theisen (2012), uncovers domestic waste collection at household level as slow and labour intensive because of inadequate storage and large amounts of leaves and garden waste.

However, the findings from qualitative data indicate that Uasin Gishu County Government, County NEMA Officials and area local chief showed that Uasin Gishu County Government uses County Lorries and Skip Tractors as well as hiring private waste handlers engaged by the county. Self-help groups also participate in the collection and transportation of domestic wastes for example Langas matatu operators, Good neighborhood and Nerenik Enterprises Youth Groups. The residents from the estate also hire donkey carts to collect and transport their solid wastes to illegal dumpsites.

6. CONCLUSIONS AND RECOMMENDATIONS

The study established that there are inefficiencies in household waste collection by the County government. Community members were more involved with household waste collection. The main household waste collectors were self-help groups. The households were paying for waste management services offered by individuals or groups. Failure by some households to pay for waste management services to stakeholder may lead to withholding of the waste management services by the concerned leading to inefficiencies in waste management. Domestic solid wastes were not collected on daily basis, this implies that there was piling of wastes in the study area. The study recommended that there is need to separation of household wastes at the source to allow for efficient management of household wastes and also investing in efficient transportation of the stored wastes without delay to avoid heaps of household wastes at the storage areas.

REFERENCES

- [1] Ahmed (2014). *Assessment of Medical Solid Waste Management in Khartoum State Hospitals*. Journal of Applied and Industrial Sciences, 2 (4) 201-205.
- [2] Chiwandamira, L. (2000). *Environmental Policy*, Harare, Zimbabwe Open University. *Citizen Participation, Cooperation and Education for Responsive Solid Waste Management in Asian Cities*.
- [3] EPA (2007). *Municipal Solid Waste in The United States: 2007 Facts and Figures*. USA EPA Publication.
- [4] Evans, N. Hoornweg, N. Kyte, W. Patel, I. Khonje, C. & Longwe, B. (2012). *Assessing urban recycling in Developing cities of Sub-Saharan Africa*. 45 (23) pp 211-222
- [5] Heermun, D. (2013). *Decentralised composting in Southern Africa*. 49 (57) pp 281-289.

- [6] Japan International Cooperation Agency (JICA), (2008), *The study of Solid Waste Management in Nairobi City in the Republic of Kenya*, Interim Report, CTI Engineering Co. LTD Environmental Technology Consultants Co; LTD. Nairobi City Council, Ministry of Local Government, The Republic of Kenya (1997).
- [7] Khan, M. (2016). *Evaluation of solid waste generation, categories and disposal options in developing countries: A case of Nigeria*, 13 (3), pp 54.
- [8] Kothari C.R (2008). *Research Methodology: Methods and Techniques*. New Age International.
- [9] Krejcie, L & Morgan, K (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, 30, 607-610.
- [10] Manira, G (2012). *Community Participation in Solid Waste Management Kathmandu*. Unpublished Thesis, University of Bergen, Norway
- [11] Muller, S. & Scheinberg, A. (2012). Different interpretations of community participation in waste management in Bamako. In *Environment and Urbanisation* 14 (34) pp241-258)
- [12] Tchobanoglous, *et al* (2013). *Integrated solid waste management: Engineering principles and management issues*, McGraw-Hill, Inc, New York.
- [13] Tevera, D. Chimhowu, A. Chimbetete, N. & Gandure, S. (2002). *Urban solid waste in Zimbabwe*, in Conyers, D, Matovu, G. and Tevera, D. (ed). 2002. *The challenges and new innovations in urban solid waste management: Issues and policy options*, Municipal Development Programme, Harare.
- [14] Tevera, D. Chimhowu, A. Chimbetete, N. & Gandure, S. (2002). *Urban solid waste in Zimbabwe*, in Conyers, D, Matovu, G. and Tevera, D. (ed). 2002. *The challenges and new innovations in urban solid waste management: Issues and policy options*, Municipal Development Programme, Harare.
- [15] UNEP (2005), *Selection Design and Implementation of Economic Instruments in the Kenyan Solid Waste Management*. Sector (Online) Available [http://www.org/PDF Kenya Waste Management Sector/ appendix.pdf](http://www.org/PDF/Kenya%20Waste%20Management%20Sector/appendix.pdf) (2005, May 10th).