HOUSEHOLD PARTICIPATION IN SOLID WASTE MANAGEMENT IN CALABAR MUNICIPALITY OF CROSS RIVER STATE, NIGERIA

BY

Eyamba, Blessing Edem
beejay79us@yahoo.com

&

Alaga, Elizabeth Godwin
lizzyalaga83@gmail.com
Department of Environmental Education,
University of Calabar

Abstract
Sustainable solid waste management is a problem for environmental protection and public health, and it has grown to be quite difficult in Nigeria. As the biggest stakeholder, households play a critical role by reducing trash volume and raising the recovery rate. Regarding this problem, this study presents the results of the investigation into the variables influencing Calabar Municipality's local waste management practices. A total of 200 households in the research region were surveyed using a questionnaire to gather data. Data analysis was done using Pearson's product moment correlation statistical method in order to test the study's hypotheses at the 0.05 threshold of significance. Data analysis and hypothesis testing revealed a significant correlation between willingness to participate, awareness of the consequences of improper waste disposal, waste collection services, and adoption of sustainable waste management services, such as waste sorting, composting, and recycling. The study suggested that households could be encouraged to take part in waste management programmes via the provision of public education and awareness campaigns, garbage collection services, access to disposal facilities, community involvement, innovative technology, and stringent policies.
Keywords: Household, participation, solid waste management, Calabar Municipality, Cross River State

Introduction and Background

The term “solid waste management” describes the procedure for gathering, moving, handling, and disposing of solid waste in a way that is sustainable and safe for the environment (Agbaji & Igbaji, 2020). There are numerous sources of solid waste, including buildings, businesses, industries, and construction sites. Collecting the material at its source and moving it to a facility for treatment or disposal is the first stage in the management of solid waste. Both communal bins located in defined places and a door-to-door collection system are options for collecting

trash. Depending on the distance and the volume of garbage produced, many technologies, such as trucks, trains, or ships, might be used for waste transportation (Bassey & Nnadi, 2020).
The garbage is sorted and divided into many categories, such as organic, non-organic, recyclable, and hazardous waste, after it has arrived at the treatment or disposal facility. The debris is subsequently processed using several techniques, including composting, recycling, incineration, landfilling, and other waste diversion techniques, in accordance with its type. The process of composting entails the breakdown of organic waste products into nutrient-rich fertiliser. Recycling is the process of turning discarded resources into fresh, reusable items. In contrast to landfilling, which entails placing waste in a specially designated landfill, incineration involves burning waste materials to produce energy. The environment's influence on trash disposal may be lessened, and the environment and human health can be protected with the use of good solid waste management techniques.
Due to the nation's rapidly expanding population and urbanisation, Nigeria, like many other emerging nations, has a serious environmental and public health dilemma with solid waste management. Only about 20–30% of Nigeria's estimated 44 million metric tonnes of solid waste are properly managed each year (World Bank, 2021). Inadequate infrastructure, subpar trash collection and disposal methods, low public knowledge, a lack of resources, insufficient legislative and regulatory frameworks, and a host of other issues make solid waste management in Nigeria difficult (Nnaji, Nnaji & Ezeuduji, 2021). These issues have led to an increase in illegal dump sites, open trash burning, and degradation of the environment and rivers.

The government, commercial sector, and civil society have all worked together recently to enhance solid waste management in Nigeria. The National Environmental Sanitation Policy and the National Policy on Solid Waste Management are two examples of government-developed policies and laws that serve as guidelines for waste management practises (Bezerra & Trevizan, 2022). Also, the government of Nigeria has started programmes to promote household involvement in solid waste management. For instance, the “Cleaner Lagos Initiative” was introduced by the Lagos State Garbage Management Authority (LAWMA) to encourage families to reduce, recycle, and dispose of garbage properly. The programme comprises setting up recycling facilities, distributing trash cans to homes, and conducting public awareness campaigns.

In Nigeria, the private sector has also assumed a bigger role in managing solid waste. State governments have hired private businesses like Visions cape Sanitation Solutions to offer waste management services such as garbage collection, sorting, recycling, and disposal. Scavengers and trash pickers working in the informal sector have proven essential to recycling and waste management in Nigeria. Additionally, to encourage households in Nigeria to practice waste reduction and recycling, civil society organisations like the Environmental Conservation Organisation (ECO) and Recycling Point Dot Com have been active (UNEP, 2020). Additionally, the Women in Waste Management (WIM) initiative seeks to empower women to

engage in waste management activities like composting and recycling as well as advance gender equality in the industry (UNEP, 2020).

Additionally, many nations have put in place community-based initiatives like waste collection, recycling, and composting programmes to promote household participation in solid waste management. These initiatives may strengthen a sense of community and encourage shared accountability for garbage disposal. Sweden, Japan, South Korea, Germany, and the Netherlands are a few examples of nations with effective household engagement in solid waste management. These nations have put in place extensive waste management plans that place an emphasis on recycling, waste reduction, and appropriate trash disposal techniques.

Despite these initiatives, Nigeria's solid waste management still needs to be improved. Government funding and resources should be increased for the industry in order to scale up and spread sustainable waste management practices across the nation. To encourage a culture of waste reduction and safe garbage disposal, increased public awareness and education efforts are also necessary. Any waste management programme's success depends on households' involvement in solid waste management. Household participation may assist in decreasing trash output, enhancing waste diversion, and encouraging sustainable waste management practices. Household garbage makes up a significant fraction of the overall waste created in a city.

As the primary producers of solid waste, households must take an active role in waste management if Cross River State is to overcome its challenges. Households can take part in waste management through community-based initiatives like waste collection, recycling, and composting programmes. These initiatives could strengthen a sense of community and encourage shared accountability for garbage disposal. The knowledge, attitudes, and behaviours of households with regard to waste management could be revealed through research on household involvement in solid waste management. It could also provide strategies for inspiring and motivating families to take part in waste management efforts. The study has implications for how policymakers and stakeholders may create and execute more efficient waste management policies and programmes. The results, for instance, could help with the creation of focused public education and awareness campaigns to raise household understanding of the significance of good waste management practises. A waste management infrastructure customised to the demands and limitations of homes, such as small-scale trash disposal facilities or mobile garbage pickup services, could also be developed with the help of this study. The study's findings would contribute to the development of a household-driven waste management system in Cross River State that is more efficient and sustainable.

Methodology

The study's location is Calabar Municipality Local Government Area of Cross River State situated in South-East Nigeria. It covers a region of around 406 square kilometres and is located

in the state's southern region. The local government areas of Akpabuyo, Odukpani, and Calabar South encircle Calabar Municipality. The National Population Commission of Nigeria (NPC, 2006) estimates that the region has a population of over 300,000. The Efik and Qua people, who are mostly Christians and speak Efik and English, are the two main ethnic groups in Calabar Municipality. The annual Calabar Carnival, which draws tourists from all over the globe, is only one example of the rich cultural history that Calabar Municipality is recognized for (Calabar Carnival, 2023). A number of historical attractions, including the Mary Slessor House, the Calabar Museum, and the Slave History Museum, are also located in the region. Due to its advantageous position on the Calabar River and its proximity to the Atlantic Ocean, Calabar Municipality is significant to the economies of Cross River State and Nigeria as a whole (Umo, 2014). The region is a centre for marine activity, and the Calabar Port, one of Nigeria's busiest ports, is located there. Agriculture, commerce, and tourism are some of the other economic activities in the region (Onuoha & Anyanwu, 2015).

This study adopted a cross-sectional research design where the research area was split into 10 divisions according to the current electoral wards, from which 5 wards were randomly chosen. This approach of multi-stage selection was adopted. Additionally, a total of 200 households were chosen at random from 40 households in each of the 5 wards. The oldest person in each chosen home, or a representative in cases where the intended person is not accessible, made up the majority of the sample size since the current research deemed them to be actively engaged in solid waste collection and management.

The questionnaire, which included both structured and unstructured questions, was designed to find out whether householders were willing to engage in sustainable solid waste management practices like composting, separation, and recycling, as well as their knowledge of the detrimental effects of unsustainable management practices and the presence of infrastructure and waste collection services in the study area. To assure the empirical validity of this research and to prevent copy loss, all the disseminated copies of the questionnaire were carefully tracked. Statistical Package for the Social Sciences (SPSS ver. 25) and Microsoft Excel for Windows (2010) were used to analyze the data obtained from the questionnaire survey. Using inferential and descriptive statistics, some of the questionnaire survey's nominal data were examined. The Pearson's Moment Correlation Statistics were used at a probability threshold of 0.05 to evaluate if there was a significant correlation between the dependent and independent variables.

Results and Discussion

The present study on household participation in solid waste management identified key findings that can help improve waste management in Calabar Municipality.

Ho1:
There is no significant relationship between willingness to participate and the adoption of sustainable solid waste management practices.

The independent variable in this hypothesis is willingness to participate, while the dependent variable is the adoption of sustainable solid waste management practices. The Pearson's Product Moment statistical tool was used for data analysis. The result of this analysis is presented in Table 1. The result in Table 1 indicates that the calculated r-value of 0.76 is greater than the critical r-value of 0.117 at the 0.05 level of significance and 198 degrees of freedom. With this result, the null hypothesis was rejected while the alternate hypothesis was upheld. The implication of this is that there is a significant relationship between willingness to participate and the adoption of sustainable solid waste management in the area.

Table 1: Result of Pearson's Product Moment Correlation analysis of the relationship between variables. N = 200

Variables	$\bar{X}$	SD	r-cal	Sig,
Willingness to participate in solid waste management	15.75	3.57	0.76	0.00
Knowledge of the negative impacts of improper waste disposal	14.98	3.93	0.60	0.00
Waste collection service/infrastructure	15.40	3.86	0.70	0.00
Adoption of waste management services	15.58	3.62	-	-

Significant at 0.05, df = 198, critical r = 0.117

The study found that most households in the area are willing to participate in waste management activities such as sorting waste, composting, and recycling. This indicates that there is a willingness among households to adopt sustainable waste management practises. The present finding is in agreement with the previous report by Uzoma and Ezenwaji (2018), who attributed the willingness of households to participate in solid waste management in Calabar Municipality to several factors. Many households are aware of the negative impacts of improper waste disposal on public health and the environment. They understand that proper waste management practises such as sorting waste, composting, and recycling can help reduce the negative impacts of waste disposal and protect the environment. Some households are motivated by the economic benefits of waste management. For example, households can generate income from selling recyclable materials such as plastic bottles and aluminium cans. Additionally, composting can produce organic fertiliser that can be used for gardening or sold to other households. Some households are motivated by social norms and community pressure. The present finding also supports Okoroigwe and Uzochukwu (2018), who reported that in some communities, waste management is seen as a collective responsibility and households are expected to participate in waste management activities. Some households are motivated by the desire to improve their quality of life. Proper waste management practises can help reduce the presence of pests and insects, improve air quality, and create a cleaner and more pleasant living

environment. The willingness of households to participate in solid waste management in Calabar Municipality is driven by a combination of factors, including awareness, economic benefits, social norms, and quality of life. By addressing the barriers to household participation and promoting sustainable waste management practises, it is possible to harness these motivations and improve waste management in the area.

Ho2:
There is no significant relationship between knowledge/awareness of the negative impacts of improper waste disposal and adoption of sustainable waste management practices.

The independent variable in this hypothesis is knowledge/awareness of the negative impacts of improper waste disposal while the dependent variable is the adoption of sustainable waste management practices. Pearson's Product Moment statistical tool was used for data analysis. The result of this analysis is presented in Table 1.

The result in Table 1 indicates that the calculated r-value of 0.60 is greater than the critical r-value of 0.117 at the 0.05 level of significance and 198 degrees of freedom. With this result, the null hypothesis was rejected while the alternate hypothesis was upheld. The implication of this is that there is a significant relationship between knowledge or awareness of the negative impacts of improper waste disposal and the adoption of sustainable waste management practises. The present study identifies a lack of knowledge and awareness as a major barrier to household participation in waste management. Many households are unaware of the negative impacts of improper waste disposal and the benefits of proper waste management practices such as recycling. Therefore, there is a need for public education and awareness campaigns to inform households about the importance of sustainable waste management practices. There is a lack of public education and awareness campaigns about the negative impacts of improper waste disposal and the benefits of proper waste management practices. Many households are not aware of the harm caused by improper waste disposal to the environment, public health, and economy. Similarly, they may not know the benefits of proper waste management practices, such as reducing pollution and improving their quality of life. The present finding agrees with the study by Udoimuk, Ezeabasili, and Asuquo (2018), who reported a lack of information dissemination on the available waste management facilities and infrastructure among the factors that influence household participation in solid waste management in Calabar Municipality. The present finding is also in agreement with the study by Ekpenyong and Inam (2015), who reported that low participation could be because households are unaware of the types of waste management facilities and infrastructure available, such as waste collection services, recycling centres, or composting facilities. Therefore, they could not know how to dispose of their waste properly. Some households lack the knowledge and skills required for proper waste management practices, such as sorting waste, composting, and recycling. They may not know how to sort their waste, which materials are recyclable, or how to compost their organic waste.

Ho3:

There is no significant relationship between waste collection services, infrastructure, and the adoption of sustainable waste management services. The independent variable in this hypothesis is the waste collection service or infrastructure, while the dependent variable is the adoption of sustainable waste management services. The Pearson's product moment statistical tool was used for data analysis. The result of this analysis is presented in Table 1, which indicates that the calculated r-value of 0.70 is greater than the critical r-value of 0.117 at the 0.05 level of significance and 198 degrees of freedom. With this result, the null hypothesis was rejected while the alternate hypothesis was upheld. The implication of this is that there is a significant relationship between waste collection services, infrastructure, and the adoption of sustainable waste management services.

This finding is in line with the report by Agbaji and Igbaji (2020), who found that a lack of waste collection services and infrastructure is a major obstacle to household participation in waste management. Many households reported that they do not have access to regular waste collection services, which makes it difficult for them to dispose of their waste properly. With similar findings, Ayade and Agara (2017) suggested the need for increased investment in waste collection services and infrastructure in Cross River State.

Conclusions/ Recommendations

The following conclusions concerning households' involvement in solid waste management in Calabar Municipality of Cross River State, Nigeria, are formed based on the results of the current research. According to the report, families contribute significantly to the production and environmentally responsible management of solid waste. The study identified a number of factors that influence households' involvement in solid waste management in the study area. These elements include willingness to take part, their awareness or knowledge of the value of appropriate waste management, their capacity to access garbage collection services, and the accessibility of waste disposal facilities.

On the basis of the study's results, the following suggestions are made to the government for action:

1. Boost public education and awareness campaigns to inform families about effective waste management practices.
2. Enhance garbage collection services, especially in low-income areas, by providing consistent schedules and reaching isolated locations.
3. Improve access to garbage disposal facilities in both urban and rural areas to discourage careless dumping and incentivize their use.
4. Encourage community involvement to foster ownership and accountability for waste management.
5. Introduce innovative waste management technologies, like waste-to-energy systems, to complement traditional practices and generate renewable energy.
6. Create and enforce waste management policies, including rules and sanctions for noncompliance, to ensure adherence to best practices.

References

Agbaji, E. B., & Igbaji, F. N. (2020). Solid waste management in Calabar Municipality: Challenges and prospects. *Journal of Applied Sciences and Environmental Management*, 24(5), 855- 861.

Ayade, B. E., & Agara, E. E. (2017). State of solid waste management in Cross River State, Nigeria. *International Journal of Environmental Studies*, 74(1), 36-47.

Bassey, E. C., & Nnadi, F. N. (2020). Assessment of solid waste management in Calabar, Cross River State, Nigeria. *Journal of Environmental Science, Toxicology and Food Technology*, 14(10), 25-30.

Bezerra, L. G., & Trevizan, V. P. (2022). Federal Decree No. 10,936/2022 - New National Policy on Solid Waste Regulation. Federal Decree No. 10,936/2022 - New National Policy on Solid Waste Regulation | Perspectives & Events | Mayer Brown Accessed 4th May 2023.

Calabar Carnival. (2023). About Calabar Carnival. Retrieved from https://calabarcarnival.com/about/ Accessed 4th April 2023.

Delgado-Serrano, M. C., Gomez-Lorente, D., & Contreras-Izquierdo, M. d. J. (2019). Community participation in solid waste management: A case study in a rural area of Colombia. *Sustainability*, 11(16), 4375.

Ekpenyong, A. B., & Inam, E. E. (2015). Awareness and attitude towards solid waste management in Calabar Municipality, Nigeria. *International Journal of Research in Applied, Natural and Social Sciences*, 3(5), 116-122.

Lagos State Waste Management Authority (LAWMA) (2021). Cleaner Lagos Initiative. Retrieved from https://www.lawma.gov.ng/cleaner-lagos-initiative/ Accessed 4th May 2023.

National Population Commission. (2006). Census 2006 Priority Tables Volume IV Cross River State. Abuja: National Population Commission.

Nnaji, C. O., Nnaji, C. C., & Ezeuduji, I. O. (2021). Solid waste management in Nigeria: A review of challenges and prospects. *Journal of Environmental Management*, 284, 112008. https://doi.org/10.1016/j.jenvman.2021.112008

Okoroigwe, E. C., & Uzochukwu, O. A. (2018). Willingness to participate in solid waste management among households in Calabar Municipality, Cross River State, Nigeria. *African Journal of Environmental Science and Technology*, 12(3), 96-105.

Onuoha, F. C., & Anyanwu, C. I. (2015). Socio-economic significance of Calabar municipality. *International Journal of Humanities and Social Science Research*, 5(1), 8-17.

Udoimuk, A. B., Ezeabasili, A. C., & Asuquo, E. N. (2018). Factors influencing household participation in solid waste management in Calabar Municipality, Cross River State, Nigeria. *International Journal of Environmental Science and Technology*, 15(5), 1045-1054.

Umo, U. (2014). Culture and tourism development in Cross River State, Nigeria. *European Scientific Journal*, 10(6), 1857- 7881.

United Nations Environment Programme (UNEP) (2020). Women in waste management: A compilation of good practices. https://wedocs.unep.org/bitstream/handle/20.500.11822/33182/WomeninWasteManagement_2020.pdf?sequence=1&isAllowed=y

Uzoma, O. K., & Ezenwaji, E. E. (2018). Household perception, attitudes, and willingness to participate in solid waste management in Calabar Municipality, Nigeria. *International Journal of Science and Research*, 7(8), 738-743.

World Bank (2021). Nigeria urbanization review: Managing urbanization for inclusive and sustainable development. https://openknowledge.worldbank.org/handle/10986/35412 Accessed 4th May 2023.