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Assessment of Solid Waste Management Practices Adopted and Their Effectiveness in Jalingo Local Government Area, Taraba State, Nigeria

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Abstract
Municipal solid waste creation has increased as a result of population growth, urbanization, and economic growth, yet environmentally sustainable management is still a problem on a global scale. This study assessed the solid waste management practices adopted and their effectiveness. 400 copies of the structured questionnaire were distributed at random to the households. The results showed that Females responders were 55%, while the overall response rate was 84%. Open dumping (38%) was the major solid waste management practice in the study area, the respondents also attest that the practices was not effective (52%). The study also showed that 71% of the respondents generate their waste daily while 18% dispose of their waste daily. The study recommend more waste collection systems, frequent evacuation of collected wastes and reactor system of composting be used in the treatment of these wastes because of its flexibility, adaptability, modularity, cost-effectiveness, and eco-friendliness in the study area.

Keywords: Solid Waste, Management, Practices, Adopted, Effectiveness and Jalingo

Introduction

Globally, the production of solid waste has risen in step with other socio-economic indicators like population, per capita income, and consumption trends (Achankeng, 2003). The amount of garbage produced per person in industrialized nations has roughly tripled over the past 20 years (AfDB, 2002). Waste management procedures receive little attention, as it is usual to witness piles of trash polluting the streets of big cities and being thrown carelessly into drainages, vacant lots, and open spaces, particularly in developing countries. This has aided in the development of infectious diseases as well as flooding and other environmental issues in the impacted areas (Babalola et al., 2010).

Low collection coverage and inconsistent collection services are just two of the issues that a typical solid waste management system in poor nations faces (Omran et al., 2007). If developing nations, particularly Nigeria, are to achieve the reduction of solid waste in cities by 75% as recommended by the Millennium Development Goals (MDGs) in 2015, it is becoming an increasingly challenging undertaking (Omran et al., 2007). In order to close the gap between the rate of waste generation and that of collection and disposal, careful planning and proper resource allocation are required due to the growth of the human population and increased economic activity. Trash is a matter of place and time since there are many differences in how trash is handled and disposed of within and between cities, regions, and countries (Ojemudia and Ojigi, 2006).

According to Adewole (2009), solid waste management is the systematic management of waste generation, storage, collection, transportation, separation, processing, recovery, and disposal. Solid waste is produced in Nigeria in a variety of settings, including houses, businesses, markets, schools, and the hospitality sector. Therefore, a wide range of distinct solid wastes originating from various sources might be produced as a result of all of our daily activities. The pace at which these solid wastes are correctly disposed of is known as solid waste management.

The amount of waste that is produced every day in the nation has dramatically increased in recent years. The population growth rate, urbanization, industrialization, and economic growth are all

contributing factors to this. Additionally, many Nigerian cities lack efficient garbage management systems. Due to this, the majority of urban households dispose of their trash inadvertently through burning, burying, and dumping (Agunwamba et al., 2003).

According to Rachel et al. (2009), the lack of public policy, enabling legislation, and an environmentally motivated and informed population are to blame for Nigeria's waste management issues. Sustainable waste management depends on institutional structures and policies that are appropriate for the execution of waste management methods. Waste management is a problem or a difficulty when the policy is bad, the public is not properly educated, or rules and regulations are not properly enforced.

Municipal Solid Waste (MSW) dumping is becoming more prevalent in Jalingo in particular and throughout Nigeria, and it is made worse by a vicious cycle of poverty, population growth, a drop in standard of living, bad governance, and a lack of environmental awareness. The result of everything is that this material is dumped in any open area that is available (Rachel et al., 2009). It has been noted that in some regions of many organically grown cities, poor or inefficient land use planning has led to the development of informal settlements with congested streets, making it challenging for garbage collection trucks to reach such places (Nabegu, 2010).

Numerous districts of Taraba State, particularly those with high levels of activity, lack access to structured waste management services; instead, waste is left unattended, buried, or burned without regard for the repercussions (Nilson-Djerf and McDougall, 2000). Adefemi and Awokunmi (2009) noted that although households burn solid waste because it is economical and affordable, the act is not eco-friendly for the ecosystem.

Another justification for burning solid waste is to reduce serious hygienic issues, but this goes beyond simple burning because it also releases harmful air pollutants like dioxins and furans, a compound that causes cancer, as well as other ozone-depleting and greenhouse gases (Hassan et al., 2010). When the government collects, it is frequently irregular in some places. It is not acceptable how waste is collected, transported, and finally disposed of. When waste is neglected for an extended period of time, it poses major health risks, emits unpleasant scents, contaminates underground water sources, and degrades the aesthetics and cleanliness of the environment. And as a result, this study was established to evaluate the waste management techniques used and their efficacy in the study area.

This study's objective is to identify solid waste management practices adopted and its effectiveness Jalingo local government Area.

Material and Methods

Study Area

The state of Jalingo Taraba is in the northeastern region of Nigeria. The Jalingo Local Government Area, with a land area of roughly 204,073 km2 and an elevation of 351 meters above sea level, is located between latitudes 08° 43'N and 09° 07'N of the equator and longitudes 10° 50'E and 11° 25'E of the Greenwich meridian. According to Oruonye (2016), Jalingo is bordered to the north by the Ardo-Kola Local Government Area, to the east by the Yorro Local Government Area, and to the south and west by the Lau Local Government Area. Ten administrative wards (Turaki A, Turaki B, Sintali A, Sintali B, Majidadi, Sarkin Dawaki, Kachalla Sembe, Barade, Kona, and Yelwa) make up the city's political and administrative structure.

The majority of solid trash in the form of packaging materials, including polythene, cans, bottles, and cardboard boxes, is produced by cross-border activity. Banking, retail, and the freight industry make up the majority of the town's formal commerce, while auto mechanics, food vendors selling things like cell phone accessories, and apparel flea markets dominate the informal sector (Chanza et al., 2017).

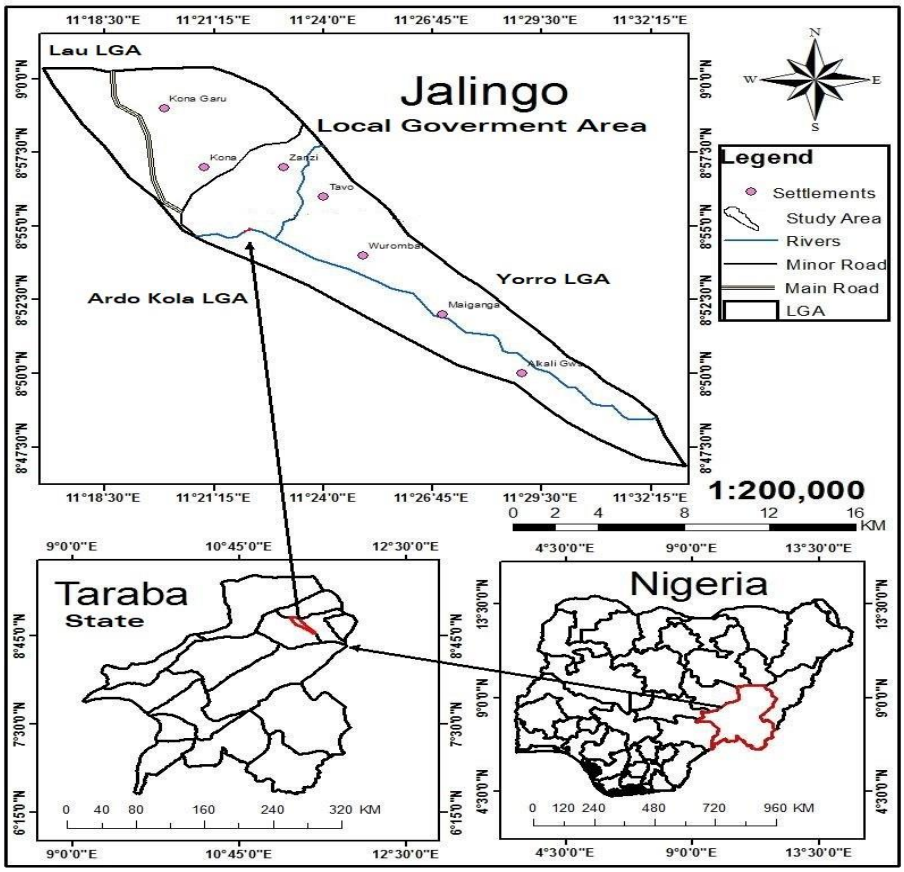

Figure 1: The Study Area
Source: Geography Department Taraba State University Jalingo, (2022).

Methodology

The survey makes use of both primary and secondary data; the first round of data collection involved 400 structured questionnaires that were dispersed at random across Jalingo's homes and businesses. The organization in charge of managing the state's solid waste is the Taraba State Ministry of Environment. There are other sources of data, such as field research and interviews with ministry employees.

Journal articles, studies (particularly the state report on garbage generation and management), books, and online resources are additional sources of information for this essay. A survey of the town's solid waste collection locations and the disposal site—whether they were strategically placed or naturally developed by the locals to meet their needs—was conducted. Both legal and illicit dumpsites had their names and locations noted; this information was then coded into Excel for manipulation and evaluation.

The information gathered includes the respondent's demographics (Sex, Age, Marital Status, and Occupation), the region's solid waste management techniques, their efficacy, the locations of garbage collection points, and the ministry employees tasked with collecting the waste. The tools and managerial approach used in the collection processes the types of disposal, the quantity of vehicles, and the disposal area Data on the population and an estimate of the amount of waste produced in the city were also collected as part of the investigation.

According to Ogwueleka (2009) research, 0.48 kg of solid trash was produced daily on average per person. Microsoft Excel 2010 was used to investigate this data, this entails estimating the amount of garbage generated, estimating the amount of trash collected by the relevant agency, and figuring out whether there is a meaningful correlation between the amount of waste generated

and the solid waste management practiced in the city. A tabular, plate and chart format was used to present the analysis.

Results and Discussion

The study's conclusion evaluates substantial correlations between Jalingo's solid waste management practices and their efficacy. To demonstrate the management strategies and their efficacy in the study region, simple table percentages, plates, and charts were used.

Respondents' profile

The overall response rate was 84% as 389 of the 400 study participants successfully responded to the questionnaire. Females constituted about 55% of the respondents and this trend was similar across all five sampling sites. The majority of the respondents were in the age group of 31–40 years which constitutes 40%. 65% of the respondents were married couples, while family size one to three has the highest respondent of 36%. Of these respondents, about 37% of them were civil servants who earned 22,000 to 37,000 naira monthly. These findings are presented in Table 1.

Table 1: Respondents Profile

Sex of the Respondents	**Frequency**	**Percentage %**
Female	209	55.1
Male	170	44.9
Total	**379**	**100**
Age Distribution	**Frequency**	**Percentage %**
Below 20	38	10
20 – 30	93	24.5
31 – 40	152	40.2
41 – 50	87	22.9
Above 50	9	2.4
Total	**379**	**100**
Marital Status	**Frequency**	**Percentage %**
Single	86	22.7
Married	246	64.9
Divorced	17	4.5
Widowed	30	7.9
Total	**379**	**100**
Occupation	**Frequency**	**Percentage %**
Farmers	81	21.4
Businessmen	75	19.8
Civil Servant	139	36.7
House Wife	38	10
Others	46	12.1
Total	**379**	**100**

Source: Author's Fieldwork (2021).

Solid Waste Management Practices

In order to achieve the objective of the study, the results of the various practices employed in solid waste management in the study area are shown in Table 2. The information shows that the major solid waste management practices employed in the study area is open dumping (Plates I and II), burning (Plate III), and burying (Plate IV). The reports are as follows: 37.5% of the respondents dump their wastes openly, 34% burn their wastes, and 27.4% bury their wastes.

Table 2: Solid Waste Management Practices

Techniques	Frequency	Percentage (%)
Open Dumping	142	37.5
Burning	129	34.0
Burying	104	27.4
Others	4	1.1
Total	**379**	**100**

Source: Author's Fieldwork (2021).

This suggests that the majority of locals simply throw their trash in the gutters, on the ground, or anywhere there is an open area. By preventing the free flow of vehicles, open dumping puts the community's health at risk and obstructs access to highways. Due to the obstruction of gutters and other water routes during the rainy season, it may potentially result in flooding.

Plate I: Roadside Dump
Source: Author's Fieldwork (2021).

Plate II: ***Waste Dumped at River Donga Bank***
Source: Author's Fieldwork (2021).

Plate III: Burning of Waste
Source: Author's Fieldwork (2021).

Plate IV: Buried Waste
Source: Author's Fieldwork (2021).

Burying is also carried out in the area; all the residents have to do is dig a hole, throw their waste there, and cover it when it is filled up. Some of the residents reported that burning their waste is convenient for them, but it causes air pollution. This shows that modern means of managing solid waste such as recycling, composting, and incineration are not carried out in the study area, and the exploration and use of local initiatives and strategies that could go a long way to improving solid waste management are not carried out in the study area. It is also an indication that the solid waste management practices in the study area do not conform to sustainable waste management practices.

Reasons for the choice of Solid Waste Management Practiced

The findings for the reason for the choice of solid waste management practiced in the study area are shown in Figure 2. The figure shows that 24% of the respondents report that the reason for their choice was that it reduced the volume and concentration of solid waste in the study area; 21% of the respondents report that it makes the environment clean; 19% of the respondents report that it reduced disease outbreaks; 21% of the respondents report that it reduced environmental pollution; and 15% of the respondents report that it serves as a source of income generation.

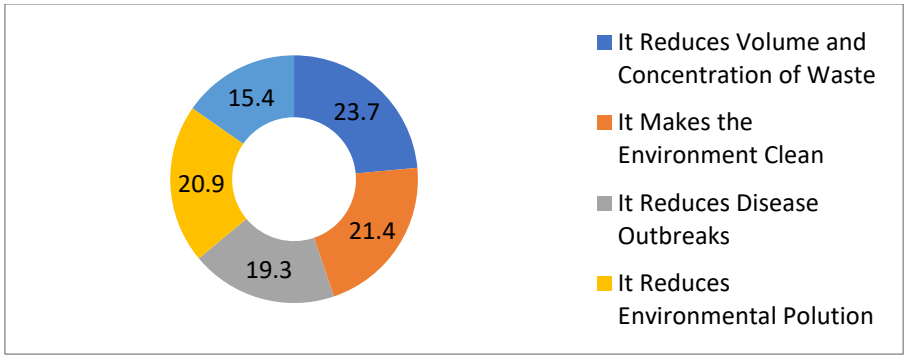

Figure 2: Reasons for the Choice of Solid Waste Management Practiced
Source: Author's Fieldwork (2021).

This finding reveals that the majority of the respondents were aware that solid waste management practices have an impact on the environment where they live.

Effectiveness of Solid Waste Management Practiced

In order to achieve the fourth objective of the study, the results on the effectiveness of solid waste management practices in the study area are presented in Table 3 below. The study shows that 52% of the respondents' report that the waste management practiced in the study area is not effective, 41% report that the solid waste management practiced in the study area is effective, and 7% report that the effective management is very effective.

Table 3: Effectiveness of Solid Waste Management Practiced

Values	Frequency	Percentage (%)
Not Effective	196	51.7
Effective	157	41.4
Very Effective	26	6.9
Total	**379**	**100**

Source: Author's Fieldwork (2021).

This is an indication that the effectiveness of the solid waste management practices practiced by residents, such as open dumping, burning, and burying of solid waste, could be a source of health problems for the residents and can make roads inaccessible by obstructing the free flow of traffic. It can also lead to flooding due to blockages in gutters and other water channels during the rainy season.

The frequency of solid waste management practices

The result on the frequency of waste generation and disposal in the study area is shown in Figure 1.2. The study showed that 71% of the respondents generate their waste daily while 18% dispose of their waste daily; 22% of the respondents generate their waste weekly while 49% dispose of their waste weekly; 6% of the respondents generate their waste twice a week while 32% of the respondents dispose of their waste twice a week. This implies that the rate of waste generation is greater than the rate of waste disposal.

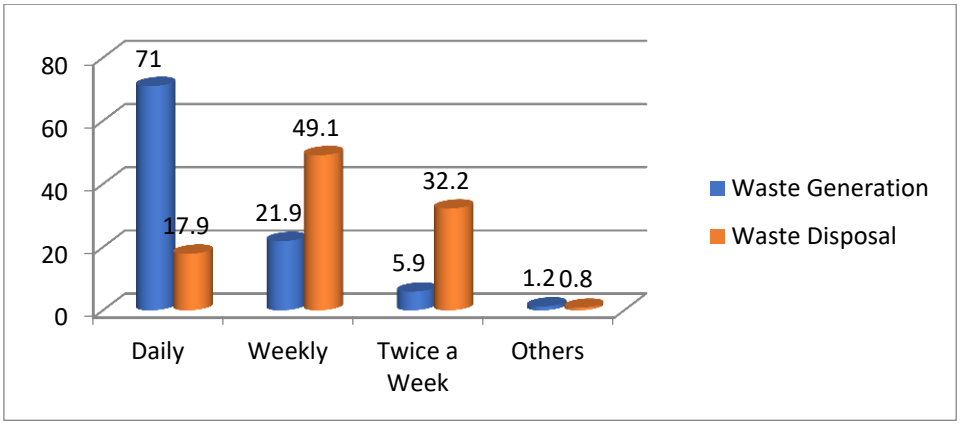

Figure 3: Frequency of Solid Waste Management Practices.
Source: Author's Fieldwork (2021).

The volume of solid waste being generated is seen as continually increasing at a faster rate than the efforts and ability of the responsible agencies to improve on the technical and financial resources needed to curtail this growth. Therefore, solid waste management and pollution control in Taraba State are characterized by insufficient methods of collection, transfer, and storage, insufficient coverage of the collection system, and uncontrolled disposal of the waste.

Conclusion

The effectiveness of the solid waste management techniques used in the Jalingo Local Government Area is investigated in this study. According to the study, open burning accounted for 38% of all solid waste disposal procedures in the study area and was followed by open dumping, burning, and burying as the other significant practices. According to the study, solid waste management was chosen because it minimizes the volume and concentration of trash (24%). The study also revealed that while 18% of respondents generated waste daily, 71% disposed of trash every day.

The primary form of trash disposal is open dumping, which not only contributes to environmental contamination but is also less

adaptable in urban areas where land is in short supply as a result of population growth and a strong demand for physical development. It is advised that the reactor system of composting (the vertical composting unit) be used in the treatment of these wastes because of its flexibility, adaptability, modularity, cost-effectiveness, and eco-friendliness. This is because the majority of waste created is biogenic. The inexpensive compost that may be produced by this technology would be very helpful to farmers in rural areas surrounding Jalingo in their efforts to grow food crops there. Adopting the contemporary idea of waste management will help the town become cleaner while also maximizing its potential as a significant waste management method in the study area.

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