

Spatial location of municipal solid waste disposal in Karu Local Government Area, Nasarawa State

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Abstract

Solid waste disposal in Nigeria has been of great concern to the government this is centered on the fact that major streets experience continual presence of solid waste from varying sources. The aim of this research identify means of disposing municipal solid waste disposal in Karu. the following specific objectives were identified; Identify the dumpsites for disposal of municipal solid waste in Karu, Evaluate the factors influencing municipal solid waste disposal in the study area; Examine options available for management of municipal solid wastes in the study area. The population for the survey was made up of 400 persons in the area to be sampled on wastes from residents which the questionnaires will be randomly distributed. The results of the findings indicate that a significant proportion of respondents in Karu engage in unauthorized waste disposal practices. The data shows that 92.6% of respondents admit to dumping waste in unauthorized places. The results indicate that the lack of facilities for proper waste disposal is the primary reason, cited by 55.1% of respondents. Other reasons include lack of information (14.7%), desire to save costs (7.6%), and inadequate penalties for unauthorized waste disposal (19.0%). The study recommends establishment of more collection and dumpsites at interior areas, development of sanitary landfill and involvement of the private sector.

Keywords: Dumpsites, Municipal, Population, sanitary land fill, Solid Waste disposal.

1. Introduction

Municipal solid waste management is an important parameter to measure the sanitation level in a community, an effective waste management system is necessary to enhance and sustained the public health as poor waste management practice will precipitate serious environmental problems such as air, land surface and underground water pollution creation of harbor and breeding grounds for insects, rodents and other alternative hosts, associated with human disease (Igoni et al. 2007; Ogwueleka, 2009).

In many developing countries, including Nigeria, waste is typically disposed of in open dumps, unmanaged landfills, or by

being burned in residential areas. These common practices have prompted a research focus on municipal solid waste disposal in Karu Local Government Area, Nasarawa State.

Statement of the Problem

Nigeria faces a significant challenge with solid waste management. Waste is often left in open dumps, uncontrolled landfills, or simply burned in residential neighborhoods, creating ongoing public health and environmental issues. Despite the severity of this problem, most research has focused on Nigeria's older, larger cities. This leaves a critical gap in our understanding of the situation in fast-growing, newer urban areas like Karu

LGA. This study directly addresses this gap by examining municipal solid waste disposal in Karu, providing essential data to inform sustainable and effective waste management solutions for this rapidly expanding community.

Objectives of the Study

The research focuses on municipal solid waste disposal in Karu. The objectives includes to;

- i. Identify the dumpsites for disposal of municipal solid waste in Karu;
- ii. Evaluate the factors influencing municipal solid waste disposal in the study area;
- iii. Examine options available for management of municipal solid wastes in the study area;

Conceptual Framework

This work is based on the concept of integrated sustainable waste management model (ISWM) that allows studies of the complex and multi-dimensional systems in an integral way. The model used identifies the importance of three dimensions when analyzing, developing or changing a waste management system. The dimensions include the stakeholders, the elements or stages of the movement or flow of materials from the generation points towards treatment and final disposal and the aspects through which the system is analyzed (Scheinberger et al., 2011).

Waste management should be addressed from a holistic material lifecycle perspective, encompassing production, distribution, consumption, and the subsequent processes of waste collection and disposal. Globally, municipal solid waste (MSW) is recognized as one of the most pressing challenges confronting municipal authorities, largely due to rapid population growth, urbanization, and poverty (Hoornweg & Bhada-Tata, 2012; Tacoli, 2012). Since 2007, over half of the world's population has been residing in

urban centers (UNDP, 2012), and this proportion is projected to surpass 70% by 2050 (UN, 2013). The primary drivers of this urban population surge include rural-to-urban migration motivated by the search for employment opportunities, improved living standards, and enhanced access to healthcare services, which in turn contribute to lower infant mortality rates (UNDP, 2013).

Studies by Aliu et al. (2014) and the United Nations Environment Programme (UNEP, 2013) have underscored significant challenges in solid waste management (SWM). These challenges, as identified in the literature, include escalating waste generation, inadequate collection systems, improper disposal methods, insufficient legislative frameworks, limited financial resources, weak organizational leadership, public perceptions that waste management should be free of charge, and shortages of skilled personnel. Additional contributing factors are rapid population growth, accelerated urbanization, industrial expansion, economic development, and minimal stakeholder engagement. Collectively, these factors have resulted in inefficient MSW management, with waste frequently dumped in streets, waterways, and open areas, or subjected to uncontrolled burning—practices that generate serious public health risks, environmental degradation, and social problems (Butu et al., 2013).

Study Area

Location

The study was conducted in Karu Local Government Area (LGA) of Nasarawa State, Nigeria. Geographically, the area is located between latitudes 8°30' and 9°30' N and longitudes 7°30' and 8°10' E of the Greenwich Meridian. Karu LGA lies in the eastern part of the Federal Capital Territory (FCT) corridor and covers a land area of approximately 27,116.8 square kilometres (Abugu et al., 2020).

Karu town serves as the administrative headquarters of the LGA, which is one of the thirteen local government areas that make up Nasarawa State. The LGA shares boundaries with Abuja to the west, Keffi LGA of Nasarawa State to the south, and Jaba LGA in Kaduna State to the north.

Its strategic proximity to Abuja positions Karu as part of the development corridor of the Federal Capital Territory, influencing its urban growth and socio-economic activities (Kanayochukwu et al., 2019).

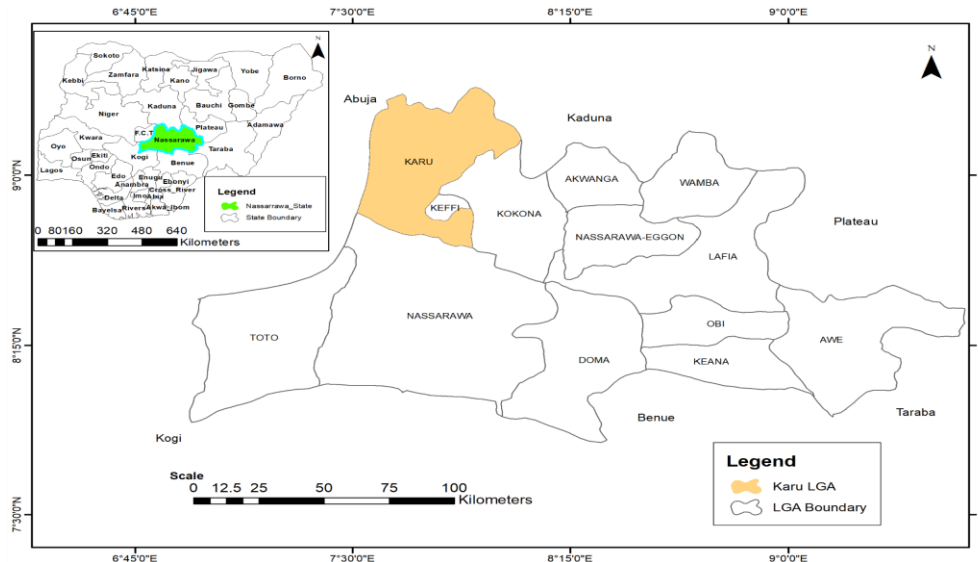


Figure 3.1: Karu local government area in Nasarawa State. Source: Nasarawa State Ministry of Lands and Survey (2016).

3. Methodology

The population for the survey was made up of 400 persons in the area to be sampled on wastes from residents which the questionnaires will be randomly distributed.

Non-probability sampling was employed for the interview process. This sampling technique involves selecting participants in a manner that does not provide every individual in the target population—in this case, the 400 individuals—an equal

chance of being chosen. Instead, selection is based on specific characteristics, accessibility, or the researcher's judgment, rather than randomization.

4. Result and Findings

Karu local government area is made up of eleven wards, which includes Panda, Tattara- Kondoro, Gurku- Kabusu, Gitata, Bagaji- Agada, Karu, Aso- Kodope, Karshi1, Karshi 2, Uke and Keffi-ShanuBetti.

Table 1: Waste Disposal Methods Used by Respondents

Waste disposal	Frequency	Percentage
Door to door collection	82	20.8%
Communal collection	198	50.3%
Open dumps	109	27.7%
Others	5	1.3%
Total	394	100.0%

Source: field work, 2024

The table 1 shows the distribution of waste disposal practices among the

respondents. The results indicate that the majority of respondents (50.3%) dispose of their waste through communal

collection, using containers provided in their neighborhoods. A significant proportion (27.7%) dispose of their waste

through open dumping, while 20.8% use door-to door collection services. A small proportion (1.3%) use other methods.

Table 2: Who is Responsible for Waste Disposal in Karu

Responsibility	Frequency	Percentage
NASWAMSA	222	56.3%
Private Companies	56	14.2%
Individuals	80	20.3%
Contractors	24	6.1%
Scavengers	12	3.0%
Total	394	100.0%

Source: field work, 2024

The results of the survey indicate that respondents in Karu have varying perceptions of who is responsible for waste disposal. The majority of respondents (56.3%) responded that the waste management agency performs its responsibility of disposing the waste generated. While 20.3% responded that individuals dispose their waste in the area. While another 14.2% responded that private companies are responsible for disposal of waste in their area.

Afun (2009) observed that solid waste management in Nigeria suffers from the absence of a clearly defined allocation of roles and responsibilities. The study further emphasized that overlapping mandates among the agencies charged with enforcing various waste management laws create significant challenges to achieving effective and coordinated waste management practices.

Table 3: Reasons for Unauthorized Waste Disposal in Karu

Reasons	Frequency	Percentage
No Facilities	217	55.1%
Lack of information	58	14.7%
To Save Cost	30	7.6%
Inadequate Penalty	75	19.0%
Not Applicable	14	3.6%
Total	394	100.0%

Source: field work, 2024

The results of the survey indicate that a significant proportion of respondents in Karu engage in unauthorized waste disposal practices. The data shows that 92.6% of respondents admit to dumping waste in unauthorized places. The survey also sought to identify the reasons why people in Karu engage in unauthorized waste disposal practices. The results indicate that the lack of facilities for proper waste disposal is the primary reason, cited by 55.1% of respondents.

Other reasons include lack of information (14.7%), desire to save costs (7.6%), and inadequate penalties for unauthorized waste disposal (19.0%).

Afuni (2009),i andi Imami eti al.i (2008)i statei thati thei regulatoryi structurei thati supportsi municipali solidi wastei ini Nigeriai isi totalliyi inadequate.i Afuni (2009)i addedi thati mosti legislationsi ori regulationsi willi succedi ifi theyi arei understoodi andi acceptedi byi thei entirei public,i andi strictlyi enforced.



Table 4: Common Methods of Waste Disposal in Karu

Disposal Method	Frequency	Percentage
Sanitary Landfills	217	17.3%
Open Dumping	58	57.9%
Burning	30	24.9%
Total	394	100.0%

Source: field work, 2024

The results of the survey indicate that open dumping is the most common method of waste disposal in Karu, with 57.9% of respondents reporting this practice. Burning of waste is also a

prevalent method, with 24.9% of respondents reporting this practice. Sanitary landfills are the least common method, with only 17.3% of respondents reporting this practice.

Table 5: Solutions to Prevent Waste Dumping in Drains/Unauthorized Areas in Karu

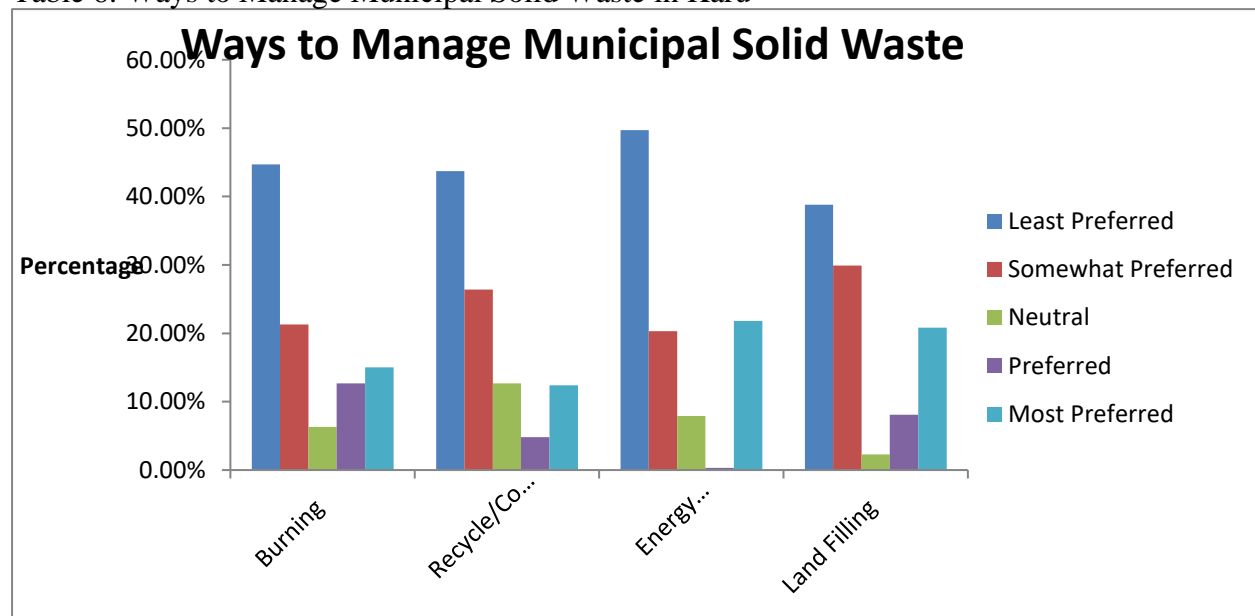
Solutions	Frequency	Percentage
Provide waste bins	221	56.1%
Regular drain cleaning	167	42.4%
Punitive measures	6	1.5%
Total	394	100.0%

Source: field work, 2024

The results of the survey indicate that respondents in Karu have varying opinions on the strategies that should be employed to prevent waste dumping in drains and unauthorized areas. The majority of respondents (56.1%) suggested that providing bins at strategic locations within the municipality is the most effective strategy for preventing waste dumping in drains and unauthorized areas. This is followed by regular drain cleaning (42.4%), and punitive measures (1.5%).

Ini ai studyi byi Babalolai eti al.i (2010)i reveale di thati inadequatei infrastructuarei andi fundingi arei obstaclesi toi ai successfuli wastei managementi system.i Iiruagai (2012)i statedi thati withouti monetariyi resourcesi toi buyi wastei trucks andi wastei bins,i buildi andi maintaini wastei sortingi facilities,i locali governmenti arei completelyi incapablei ofi operatingi successfuli wastei managementi facilities.

Table 6: Ways to Manage Municipal Solid Waste in Karu



Source: field work, 2024

The results of the survey indicate that respondents in Karu have varying opinions on environmentally friendly ways to manage municipal solid waste. The majority of respondents (44.7%) rated waste burning as their least preferred option, while 15.0% rated it as their most preferred option.

The study's findings also suggest that respondents are not enthusiastic about recycling and combusting as a means of managing municipal solid waste. The fact that 43.7% of respondents rated this option as their least preferred suggests that there may be concerns about the environmental impacts of these practices. Due to poor waste collection services, respondents established that most waste of the study area is burned (45.0%) and openly dumped (31.1%) their own waste corroborating the findings of Daffi & Kassam, (2013).

5. Conclusion and Recommendation

The existing system for managing municipal solid waste in Karu area of Nasarawa State is poor. The residual waste collection system relies on residents taking waste to

communal containers which are meant to be emptied by NASWAMSA every day, however, this rarely happens in some areas. For the entire city, there are only 5 collection points, this equates to 19,000 citizens per collection centre which is grossly inadequate. As a consequence, residents of the study area mainly manage their waste through burning (24.9%) and dumping in open dumpsites accounting for (57.9%) with subsequent environmental and social impacts.

Recommendation

The study has shown that political appointments create problems and hamper the development of an effective waste management system. There is a need for government to dissociate politics from governance by appointing only professionals of solid waste management into key positions of the Ministry of Environment and NASWAMSA. Also, there should be establishment of more collection and dumpsites in the interior areas of the municipality.



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