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SOLID WASTE MANAGEMENT IN SOME SELECTED NEIGHBORHOOD OF MINNA, NIGER STATE

BY

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Abstract

Minna Metropolis is the capital city of Niger State, Nigeria and Minna is experiencing rapid urbanization and its associated challenges including management of municipal solid waste. Waste management in Minna metropolis is the duty of the State Ministry of Environment in conjunction with Niger State Environmental Protection Agency (NISEPA). This research examines solid waste management in some selected neighborhood of Minna. The main objective is to use a digitized map of Minna with integrated geographical coordinate to map out the existing major dumpsites in Bosso, to show the distributions of the major dumpsites in Minna. The result of this research shows dumpsites are mostly found around the unplanned settlements in Minna while the waste bins are found in the planned settlements in Minna. Some of the dumpsites were found very close to residential areas and major roads which could be a causative agent of diseases to people that were resident around those areas. This study recommends the creation and integration of community-based solid waste management initiatives, especially in low-income and high-density areas of Minna metropolis. The initiatives would save cost, generate income and service opportunities, safeguard local values, encourage public participation, and minimize government investment in solid waste management services.

Keywords: *Waste Management, Dumpsites, Waste Bins, GIS*

1. Introduction

Nigeria like most developing countries is currently undergoing a process of rapid urbanization. Minna is experiencing rapid urbanization and its associated challenges including management of municipal solid waste. Solid waste is the term used to describe non–liquid waste materials arising from domestic, trade, commercial, agricultural, industrial activities, and from public services. Eight major activities generate solid waste. These are residential, industrial, commercial, institutional, construction, municipal services, process, and agricultural. It comprises of different materials: dust, food waste, packaging in form of paper, metal, plastic or glass, discarded clothing, garden waste, hazardous waste, and radioactive waste (Pruss A,1999). In developing countries such as Nigeria, the international policy that the generator of waste is responsible for the proper management, treatment, and disposal of waste has remained on paper and is yet to be implemented (Ngwuluka, 2009). Solid waste management embraces effective control of the production, storage, collection, transportation, processing, and disposal or utilization of solid waste in a sanitary aesthetically acceptable, and economical manner. It includes all administrative, financial, legal, and planning functions as well as the physical aspect of waste handling. Waste management is a global environmental issue which constitutes a very significant problem in today's world**.** The most common problems associated with improper management of solid waste include diseases transmission, fire hazards, odor nuisance, atmospheric and water pollution, aesthetic nuisance, and economic losses (Mujibor, 2008). The problem of solid waste disposal and management is the result of the structure of our urban centre, the attitudes of some people, and inadequate funds.

More than ever before, solid waste management policy-makers worldwide require reliable information on the technical performance, environmental impact, and costs of solid waste collection, recycling, treatment, and disposal. The problem of waste disposal is international, often with serious local implications (Clarke et al.,1999.). Waste management in Minna metropolis is the duty of the State Ministry of Environment in conjunction with Niger State Environmental Protection Agency (NISEPA). Currently, no data is available on the composition and quantity of municipal solid waste generation within the metropolis.

Bosso, just like other urban centers suffers from unplanned dumpsites which results to the production of bad and uncomfortable odor and ugly sights. Most dumpsites are close to residential areas which block drainages, takes up street (road) spaces, especially when unchecked. This problem of unplanned dumpsite has not only caused bad odor and ugly

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sights but it has also gone far as producing vectors (rodents and insects), repulsive, and very bad smells. Sites like these are more visible in areas like Bosso Estate, Bosso Low-cost, Angwan Biri, Newyork Bosso, Mechanic road, and Front of FUT (Bosso road).

Geographic Information System (GIS) is the collection, storage, manipulation, analyzing, and displaying of spatial geographic information and associated attributes, pertaining to specific geographic areas. This study, therefore, utilized the GIS approach to capture solid waste dumpsites in Bosso area of Minna metropolis, in Niger Delta State Nigeria.

A study conducted by Ahmed, Awaisu, and Ruth (1998) on problems of solid waste management in Minna, using GIS showed that there are lapses or inefficiency on the part of the body responsible for solid waste management in the towns and cities of Niger State. It also provides solutions to the problems by suggesting an enforcement of sanitation laws, intensified public enlightenment campaign on solid waste management, and provision of refuse bins at strategic locations. Even though previous research has been carried out on this topic in the study area, more need to be done for an update and for the fact that natural phenomena undergo changes over time. The aim of this research is to study the solid waste management in some selected neighborhood of Minna. The main objective is to use a digitized map of Minna with integrated geographical coordinate to map out the existing major dumpsites in Bosso, to show the distributions of the major dumpsites in Minna.

2. Study Area

The study was conducted in Minna and Bida areas of Niger State. Minna is the capital city of Niger State. Niger State is one of the 36 states of Nigeria, created out of the defunct North-Central geo-political zone located between longitude $3^0$30' and $7^0$20 East and latitude $8^0$20' and $11^0$30' of the Greenwich Meridian. The Provisional result of the 2006 National Population Census of Niger State is 3,950,249.

Niger State covers a total land area of 76,363km^2 or about 8.3 million hectares which represent 8% of the total land area of Nigeria. About 85% of the land is arable; the vegetation consists mainly of short and scattered trees. Soils are predominantly light and well drained. The state experiences distinct dry and wet season with annual rainfall varying from 1,100mm in the northern part to 1,600mm in the southern parts. The temperature ranges from 23^0C to 37^0C and daylight duration is averagely 8.5hours and it has a relative humidity of 40%. The dry season commences in November and ends in March while raining season commences in April and ends in October of every year.

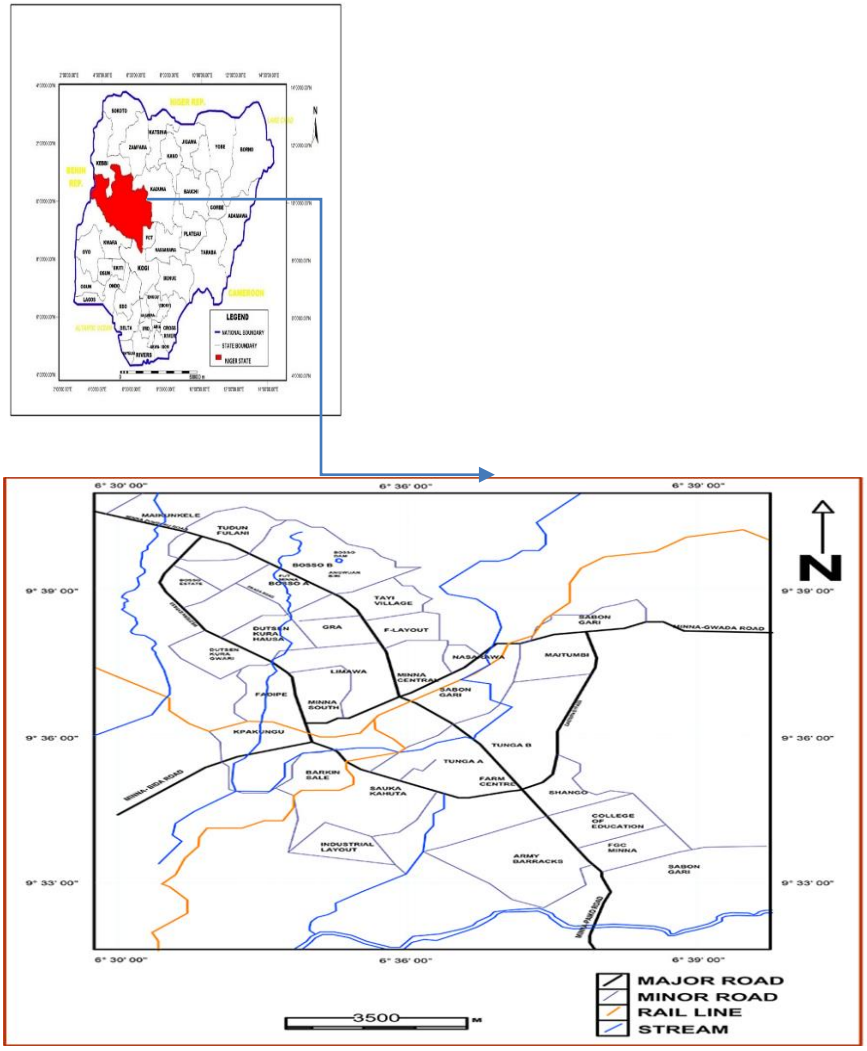

Figure 2.1: Map of Niger State showing Minna

3. Methodology

Secondary source of data collection was employed. Coordinates of dumpsites were taken from the planned and the unplanned settlements using the Geographic Positioning System (GPS). QuickBird Imagery of 2006 covering the study area (Minna) was obtained from GIS Vendor DataNET consultant, hard copy of the map of Minna and Minna land use map was also obtained from Niger State Ministry of land and was digitized in the GIS environment to obtain the distribution of dumb sites and waste types, high level of waste bins, proximity of dumpsites to residential buildings etc. This is a GIS-based study of Minna metropolis waste dump sites.

4. Results and Discussion

According to Figures 4.1 to 4.7, the dumpsites were found in large numbers around the unplanned settlements like Bosso, Angwan Biri, Randan Ruwa, and Hayan Gwari while waste bins were seen and recorded around planned settlements such as Bosso Estate and Bosso Lowcost. The dumpsites could be seen very close to the residential areas.

The findings of this study are similar to the results of Naibbi and Umar (2017) in which QUICKBIRD satellite imageries were utilized; Global Positioning System (GPS) was employed to ascertain the location of the waste sites using the topographical map (1:5000 scale) of Kano metropolis. Out of the 300 existing waste disposal sites assessed, metropolis of Kano had fair distribution of waste sites. It was found that the waste disposal sites were more at the center than the fringes or outskirts. Thus, 80% of the waste sites were locate either close to roads, settlements or water bodies. Furthermore, 92% of the waste disposal locations are open space and only 7% were used in the containers (closed dumping sites). Only 89% of the waste sites were authorized dumping sites and 11% percent were unauthorized and illegal dump sites

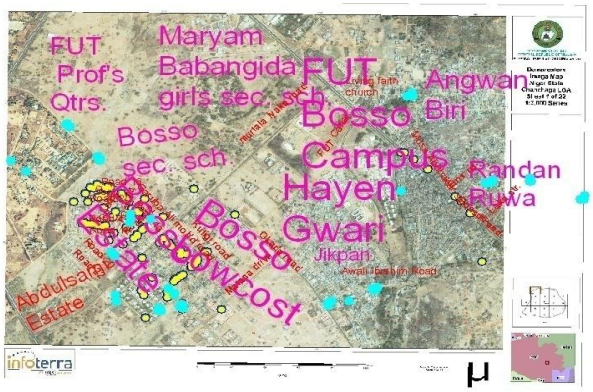

Figure 4.1Distribution of Dumpsites and Waste Bins in Bosso

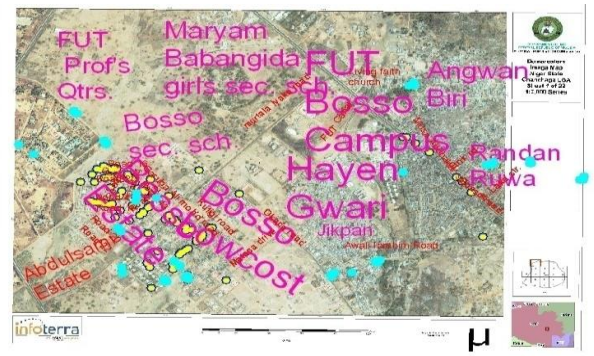

Figure 4.2 Distribution of waste bins in Bosso

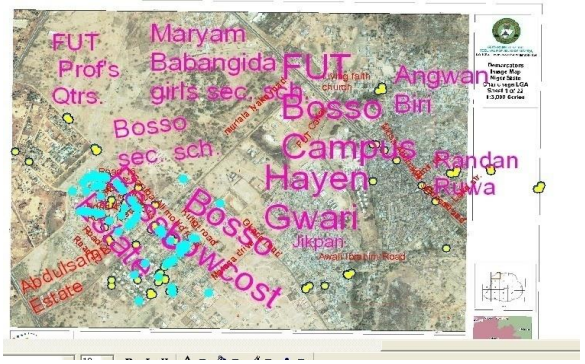

Figure 4.3Query Map of Bosso Showing Metallic Waste Bins

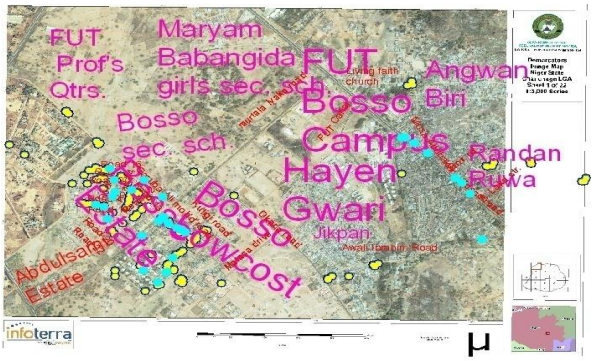

Figure 4.4 Query map of Bosso Showing Plastic Waste Bins

Figure 4.5: Areas in Bosso with high Level of Waste Bins

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Figure 4.6:Proximity of Dumpsites to Residential Buildings in Bosso

Figure 4.7: Proximity of Dumpsites to Main Roads

5. Conclusion

The result of this research shows that dumpsites are mostly found around the unplanned settlements in Minna while the waste bins are found in the planned settlements in Minna. Some of the dumpsites are found very close to residential areas and major roads which could be a causative agent of diseases to people that are resident around those areas. This study recommends the creation and integration of community-based solid waste management initiatives, especially in low-income high-density areas of Minna metropolis. The initiatives would save cost, generate income and services opportunities, safeguard local values, encourage public participation, and minimize government investment in solid waste management services.

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