



RESEARCH PAPER

## Solid Waste and its Wealth Potential for Sustainable Environmental Management in Lugbe, Federal Capital Territory, Abuja, Nigeria

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### ABSTRACT

Increased migration of people to the Federal Capital Territory (FCT) and the search for affordable housing has forced many of the city occupants to move to Lugbe, one of satellite towns. This has increased substantially, the amount and type of refuse being generated in this area. Increased waste generation has not been matched with commensurate rate of evacuation and management. Recent waste management strategies no longer see waste as just a burden, but as a source of wealth. With increased waste generation in Lugbe, this study thus seeks to assess the wealth potential of these wastes, so as to design a more economical and sustainable approach to waste management. To achieve this, the sources of waste was identified, the quantity and major characteristics of the waste generated in Lugbe was also examined. The potential economic benefit of the wastes generated was also assessed. Qualitative and quantitative data was collected for the purpose of the research. Quantitative data involved primary data collected from questionnaires administered while secondary data was obtained from Abuja Environmental Protection Board. Qualitative data was collected using key informant interviews, informal discussions as well as field observation. Data analysis was done using basic statistics while qualitative data was analysed descriptively. The findings revealed that, though Lugbe is predominantly a residential community, wastes generated there have a strong potential for recycling and income generation. The increased activities of scavengers and informal recycling centres in the study area reveal lots of income generated from the efforts at waste collection and recycling. The willingness of the respondents to sort their waste at source indicates the possibility of a successful integrated solid waste management system if adopted. It is recommended that Municipal Authorities (Abuja Environmental Protection Board) should recognize waste management in urban and rural areas as a critical issue that has implications for sustainable livelihoods, climate change and air quality, There is therefore a need to lay appropriate actions that ensure sustainable waste management along the chain. Such strategies include those that reduce waste generation or those that manage waste on site through recycling waste for transformation into useful products, enforcing penalties on poor waste disposal, supporting initiatives and innovations in waste management for household incomes generation and Government authorities need to encourage existing community initiatives/innovations in waste management and waste sorting through provision of incentives / rewarding systems.

**Keywords:** Solid Waste, Sustainable Waste Management, Lugbe, Wealth, Dumpsites

### INTRODUCTION

Waste management is the collection, transportation, processing, recycling and disposal of waste materials usually produced by human activities in an effort to reduce their effect on human health or local aesthetics or amenity (Ayuba *et al*, 2013). Waste management is an important objective of planning to ensure that the future generation inherit an environment that is as pollution free as

possible given present scientific, economic, social and political constraints. International Solid Waste Association (ISWA) and United Nations Environment Programme (UNEP).

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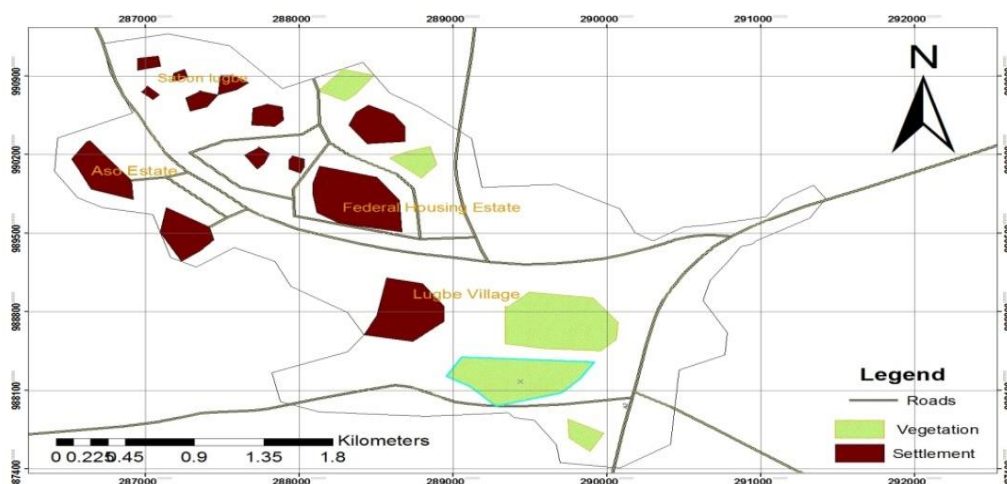
(2002). A sub-focus in recent decades has been to reduce waste materials effects on the natural world and environment and again recover resources from them. (Yudoko, G. (2000) and van de Klundert, A. & J. Anschutz. (2001) ). Municipal Solid wastes (MSW) are commonly known as trash or garbage that consist of everyday items such as product packing, grassing, chippings, furniture, clothing, bottles, food items, metal scraps, newspaper and most of all plastics and many more. In 2005, United States residents, businesses and institutions produced more than 245 million tons of Municipal Solid Waste, which is approximately 4.5 pounds of waste per capita per day (EA (Environmental Alert), 2007).

Solid waste management has become one of the most serious environmental problems facing many cities in Nigeria today. NEMA, (2004) The phenomenal increase in volume of waste generated daily in the country cannot be matched by the ineffective waste management systems obtained in most urban areas, as a result most households now resort to haphazard dumping, burning and/or burying these waste (Olanrewaju and Ilemobade, 2009). Lugbe (the study area) is also characterised by numerous open dumpsites and heaps of uncollected refuse. Increased immigration of people to Lugbe in recent times has resulted in substantial increase in the amount and type of waste being generated there. With the increased waste generation and dumpsites in the study area, there has also been an increase in scavenging activities and informal waste recycling centre within the study area. There is need therefore to assess the potential of generating wealth from the waste generated in the study area. This study thus seeks to assess the feasibility of adopting the Integrated Waste Management strategy for sustainable environmental management in Lugbe. This study has been motivated by the fact that Nigeria's urban areas often lack effective solid waste disposal system which consequently results in hills of solid waste seen on streets, gutters and in open spaces leading to flooding as a result of the of water ways and also pose a tremendous health hazard. The Federal Capital Territory Administration (FCTA) annually spends Huge sums of money on efforts to keep Abuja clean, however the city still grapples with waste management problems as some areas, particularly the satellite towns (one of which is Lugbe) stink because of the refuse heaps on the

streets and walkways. Increased immigration of people to the FCT and the search for affordable housing has forced many of the city occupants to move to the satellite towns to reside thereby increasing substantially, the amount and type of refuse being generated in these areas. Based on this, there is need to evolve more effective planning methods, in order to cope with both the present and the future problems of refuse disposal within the City. The broad aim of the study is to assess the economic potential associated with waste generation for sustainable environmental management in Lugbe and the specific objectives are to identify sources of solid waste, to assess the nature and quantity of solid wastes generated, also to assess the current waste management system practiced and to identify the potential economic benefits of waste generated in the study area.

### **Description of Study Area**

Lugbe is one of the Satellite towns in Abuja Municipal Area Council. Located on Longitude 8°57'20"N and Latitude 7°24'53"E. Lugbe is just about 10 kilometres and 4 kilometers from the Abuja International Airport and the city centre respectively. Original settlers at Lugbe were believed to be of Gbagyi origin, presently with increased development and government activities within that region, tribal distribution of the population shows a mix of nearly all major and minor tribes of the country. Though the population of Lugbe could not be obtained, the official figure of Federal Capital Territory according to the National Population Commission's Report of 2006 is put at 1,406,239 with a huge population growth rate of 9.3% per annum (NPC, 2010). The FCT experiences three weather conditions annually. This includes a warm, humid rainy season and a blistering dry season. In between the two seasons, there is a brief interlude of Harmattan occasioned by the North East Trade Wind, with the main feature of dust haze, intensified coldness and dryness. when daytime temperatures reach 28-30 degrees and night time lows hover around 22-23 degrees. In the dry season, daytime temperatures can soar as high as 40 degrees and night time temperatures can dip to 12 degrees, resulting in chilly evenings.. Rainfall in the FCT reflects the territory's location on the windward side of the Jos Plateau and the zone of rising air masses. The annual total rainfall is in the range of 1100 mm to 1600 mm (Wikipedia, Abuja n.d).



**Figure1: The study area (lugbe)**

**METHODOLOGY**

The Data collection was done in stages using an integrated approach. The data consist of quantitative and qualitative data. The quantitative data consist of primary data as well as secondary data. Primary data was collected directly from the field the aid of a well structured questionnaire administered on selected residents of the study area. Secondary data was collected from Abuja Environmental Protection Board (AEPB).

The qualitative data consist of primary data obtained by carrying out interviews informal discussion and field observation towards a holistic and in-depth study of the wealth potentials of waste generation in Lugbe. Interviews were semi-structured and carried out using purposive random. AEPB staff were interviewed as well as key informants such as residents, scavengers and private waste collectors to get a holistic view on the economic potentials of waste generation in the study area.

Photographs were taken to support the findings in the research. Secondary data was also obtained from already existing work both published and unpublished materials obtained from the textbooks, journals and the internet.

Simple random sampling method was adopted for this study. Lugbe was divided into 5 zones. 100 households were randomly selected from each zone, a total of 500 households in all the study area. Also to learn about the volume of

waste generated, 50 household (10 from each of the 5 zone) were randomly selected and waste collected for weighing. This figure represents 1/10 of the sample size. To obtain accurate data on the activities of scavengers and informal waste recyclers in the study area, 15 of them were randomly selected and interviewed.

The quantitative data was analysed statistically and data was presented on frequency tables and simple percentages. The qualitative data was analysed descriptively as well as with the use of table were needed. Triangulation through the collection of data from various sources (Primary sources, secondary sources, direct observation, interviews and informal discussion) enabled findings and perceptions about the program that was verified.

The questionnaires administered was used to gather information on the characteristics of waste generated from homes, shops, farm land, and the cottage industries located within the study area. The recyclability of the waste generated and the wealth potential of the waste were also vital information extracted from the questionnaires. The research details covered refuse generation from origin (e.g. domestic, commercial, industrial and agricultural), constituents of waste, and quantity of waste.

## RESULTS AND DISCUSSION

Table 1 Sources of Solid waste generated in Lugbe (%)

|               | Residential | Commercial | Agricultural | Industrial | Total (%) |
|---------------|-------------|------------|--------------|------------|-----------|
| FHA Phase 1   | 71          | 24         | 5            | -          | 100       |
| FHA Phase 2   | 69          | 22         | 5            | -          | 100       |
| Sabon Lugbe   | 35          | 35         | 20           | 10         | 100       |
| Lugbe Village | 20          | 35         | 45           | -          | 100       |
| Aso Estate    | 50          | 35         | 15           | -          | 100       |

Source: Author's Field work, (2016)

Based on the analysis of the questionnaire administered in the study area, the above statistics obtained indicate in percentage the sources of solid waste generated in the 5 different zones of Lugbe. The high incidence of waste generated from residential sources is

evidence of Lugbe being predominantly a residential district. This is bound to impact on the type of waste generated there.

Table 2 Average amount of Solid waste (kg) generated per household in Lugbe

| No. of households surveyed                            | 10          | 10          | 10          | 10            | 10         | Total |
|---|-------------|-------------|-------------|---------------|------------|-------|
| Areas   | FHA Phase 1 | FHA Phase 2 | Sabon Lugbe | Lugbe Village | Aso Estate |       |
| Total weight of waste collected (kg) in 1 week        | 340         | 312         | 477         | 570           | 165        |       |
| Average household waste generated per week (kg)       | 34          | 31.2        | 47.7        | 57            | 16.5       |       |
| Average daily household waste generated per Zone (kg) | 4.9         | 4.5         | 6.8         | 8.1           | 2.4        |       |

Source: Author's Field work.(2016)

Table 2 revealed that most households generate solid waste daily. The volume of solid waste generated was highest in Lugbe village area being a densely populated zone and lowest in Aso Estate being a low density zone. From the weekly data obtained, the average daily household waste generated in Lugbe was

estimated at 5.3kg per household. If this volume is aggregated over a period of a month and a year, this will indicate the availability of a large mass of solid waste.

Table 3 Percentage Constituents of Respondents Solid wastes generated in Lugbe

|               | Household Garbage (%) | Paper/ Cartons (%) | Concrete Rubbles (%) | Plastic (%) | Glass (%) | Metal scraps (%) | Total (%) |
|---------------|-----------------------|--------------------|----------------------|-------------|-----------|------------------|-----------|
| FHA Phase 1   | 73.0                  | 11.2               | 2.0                  | 10.0        | 0.8       | 3.0              | 100.0     |
| FHA Phase 2   | 75.0                  | 10.7               | 2.3                  | 9.0         | 2.0       | 1.0              | 100.0     |
| Sabon Lugbe   | 57.8                  | 8.7                | 3.4                  | 26.2        | 2.2       | 1.6              | 100.0     |
| Lugbe Village | 47.8                  | 1.2                | 12.3                 | 37.7        | 0.4       | 1.4              | 100.0     |
| Aso Estate    | 60.9                  | 15.3               | 14.0                 | 18.6        | 0.8       | 0.4              | 100.0     |

Source: Author's Field work (2016)

In Table 3, the research showed different constituents of waste which are Household Garbage, Paper, Sand/Concrete rubbles, Plastics, Glass and Metal Scraps. The high incidence of waste generated from household garbage in all the zones, reflect the high

residential status of the study area. This table serves as a pointer to the type of wastes available in the study area for recycling.

Table 4: Average Size of Households in Lugbe

| Areas         | No. of persons in building (%) |      |       |          | Total |
|---------------|--------------------------------|------|-------|----------|-------|
|               | 0-5                            | 5-10 | 10-15 | Above 15 |       |
| FHA Phase 1   | 48                             | 32   | 8     | 12       | 100%  |
| FHA Phase 2   | 40                             | 45   | 10    | 5        | 100%  |
| Sabon Lugbe   | 39                             | 28   | 18    | 15       | 100%  |
| Aso Estate    | 52                             | 30   | 16    | 2        | 100%  |
| Lugbe Village | 9                              | 21   | 52    | 18       | 100%  |

Source: Author's Field work, (2016)

From Table 4, the density of persons per building is not too high (0-5 persons) except for Lugbe Village with the highest density of

between 10 – 15 persons per building. This is reflective in the volume of waste generated from each of these zones and generally in the study area.

Table 5: Refuse Disposal method Adopted (%)

| Areas         | Private           |         | Government           |                  | Total |
|---------------|-------------------|---------|----------------------|------------------|-------|
|               | Refuse Collectors | Burning | provided refuse bins | Public Dumpsites |       |
| FHA Phase 1   | 68                | 0       | 19                   | 13               | 100%  |
| FHA Phase 2   | 65                | 0       | 16                   | 19               | 100%  |
| Sabon Lugbe   | 14                | 8       | 4                    | 74               | 100%  |
| Aso Estate    | 75                | 0       | 15                   | 10               | 100%  |
| Lugbe Village | 9                 | 5       | 2                    | 84               | 100%  |

Source: Author;s Field work(2016)

In Table 5, the major method of waste disposal by households was patronising private refuse collectors otherwise called 'Baban-bola'. This

method was mostly adopted by the low density zones like FHA Phases 1 & 2 and Aso Estate which can afford such services. Zones such as Sabon lugbe and Lugbe Village which have a high density and low income population had high precedence of open dumping at illegal dumpsites as this attracted no financial cost.

Table 6: Percentage of Households Enjoying Regular Solid Waste Collection

| Areas         | Yes (%) | No (%) | Total (%) |
|---------------|---------|--------|-----------|
| FHA Phase 1   | 30      | 70     | 100       |
| FHA Phase 2   | 28      | 72     | 100       |
| Sabon Lugbe   | 4       | 96     | 100       |
| Lugbe Village | 2       | 98     | 100       |
| Aso Estate    | 25.5    | 74.5   | 100       |

Source: Author;s Field work (2016)

Table 6 indicated that, most of the respondents do not enjoy regular collection of the waste they generate by the waste management authorities.

Many have resorted to private refuse collectors as well as open dumping.

Table 7: Amount spent on Waste disposal every month

|               | N0   | N 50 –<br>N500 | N500 –<br>N1000 | N1000 –<br>N2000 | N2000-<br>N5000 | AboveN<br>5000 | Total |
|---------------|------|----------------|-----------------|------------------|-----------------|----------------|-------|
| FHA Phase 1   | 11   | 6              | 28              | 35               | 1               | 0              | 81    |
| FHA Phase 2   | 15   | 11             | 12              | 39               | 3               | 0              | 80    |
| Sabon Lugbe   | 68   | 15             | 8               | 1                | 0               | 0              | 67    |
| Lugbe Village | 81   | 11             | 4               | 0                | 0               | 0              | 92    |
| Aso Estate    | 7    | 9              | 14              | 26               | 11              | 0              | 96    |
| Total         | 182  | 52             | 66              | 101              | 15              | 0              | 416   |
| Percentage    | 43.8 | 12.5           | 15.9            | 24.3             | 3.6             | 0              | 100   |

Source: Author;s Field work, (2016)

Table 7 reveals that 43.8% of the respondents do not pay for their waste disposal. The statistics shows a higher incidence of no payment in the high density areas of Sabon- Lugbe and Lugbe Village where patronage of public dump sites prevalent. In all the remaining 56.2% of respondents pay between N50 – N5,000 monthly

for their waste disposal with the highest incidence of 24.3% falling amongst those who spend between N1,000 – N2,000 monthly. This is an indicator that waste collection in the study area generates income either for private refuse collectors or government appointed waste managers.

Table 8: Respondent’s involvement in exchanging any of their waste products for money or other resources.

| Areas         | Yes (%) | No (%) | Total (%) |
|---------------|---------|--------|-----------|
| FHA Phase 1   | 55.0    | 45.0   | 100.0     |
| FHA Phase 2   | 61.0    | 39.0   | 100.0     |
| Sabon Lugbe   | 20.9    | 79.1   | 100.0     |
| Lugbe Village | 26.3    | 73.7   | 100.0     |
| Aso Estate    | 48.5    | 51.5   | 100.0     |

Source: author’s Field work (2016)

Table 8 shows some form of wealth generation from residents’ waste even though informally. There is a higher precedence of such activities in

Zones like FHA Phases 1 & 2 and Aso Estate as they patronise the private truck pushers more who are the main buyers of these waste products. Residents from the other zones take their recyclable waste to the dumpsites / informal recycling centres to sell or exchange with the scavengers/ “Baban-bolas”.

Table 9: Preference for separate containers for disposing off various waste constituents

| Areas         | Yes (%) | No (%) | Total (%) |
|---------------|---------|--------|-----------|
| FHA Phase 1   | 84.0    | 16.0   | 100.0     |
| FHA Phase 2   | 80.0    | 20.0   | 100.0     |
| Sabon Lugbe   | 75.9    | 24.9   | 100.0     |
| Lugbe Village | 73.7    | 26.3   | 100.0     |
| Aso Estate    | 88.5    | 11.5   | 100.0     |

Source: Author’s Field work (2016)

Though most respondents are not presently engaged in sorting their waste before disposal, the table above indicates a strong willingness to support the waste sorting process if the necessary materials are available to them. This

will also facilitate waste recycling and conversion of waste to wealth.

Table 10: Average weekly income generated by Scavengers and waste collectors.

|            | Less than<br>N1,000 | N 1,000<br>–<br>N5,000 | N5,000<br>–<br>N10,000 | N10,000<br>–<br>N20,000 | Above<br>–<br>N20,000 | Total |
|------------|---------------------|------------------------|------------------------|-------------------------|-----------------------|-------|
| Frequency  | 1                   | 8                      | 4                      | 2                       | 1                     | 15    |
| Percentage | 6.7%                | 53.3%                  | 26.7%                  | 13.3%                   | 6.7%                  | 100%  |

Table 11 shows evidence of generating income from waste generated by the ‘Babanbolas’ from less than N1,000 to above N20,000 weekly. The highest frequency of 53.3% represents respondents who earn between N1,000 – N5,000 weekly. These figures are suggestive of a strong potential for generating wealth and possible job creation from waste management and recycling activities in the study area

In this section, opportunities was identified that could help the solid waste management program improve its environmental management system and achieve the environmental, economic and social goals of sustainable development. Generally in FCT, the responsibility of solid waste management rests largely with the Environmental Protection Authorities who focus majorly on improvement of municipal management quality, privatized collection and transportation system efficient services within the city centre while most towns and settlements outside the city centre suffer much neglect. The survey revealed that 56.2% of respondents pay between N50 – N5,000 monthly for their waste disposal This is an indicator that waste collection in the study area generates income either for private refuse collectors or government appointed waste managers. The willingness of over 75% of the respondents to sort their waste at source also shows a strong potential of harnessing these raw materials in larger volumes and reduce time, energy and excessive funds to accomplish this at the dumpsites. The huge presence of scavengers otherwise called ‘Babanbolas’ in the various dumpsite also reflect economic viability of the waste products. The study revealed that 53.3% of these ‘Baban-bolas’ earn between N1,000 – N5,000 weekly. These figures are suggestive of a strong potential for generating wealth and possible job creation from waste management and recycling activities in Lugbe.

### Conclusion and Recommendations

Rapid population increase due to urbanization has forced many of the city occupants to move to satellite towns like Lugbe to reside. This has increased substantially the quantity and type of waste generated in Lugbe. Waste management services, are not adequately felt at Lugbe as the rate of evacuation and disposal of these wastes by the waste management authorities (AEPB) has not marched the rate of generation. This has led to increased illegal dumpsites as well as patronage of private refuse collectors in Lugbe. Like in many other parts of Nigeria, in the FCT, the focus has primarily been on minimizing the costs of collection of waste. The approach has not given much attention to key economic goals of waste management such as waste reduction, source segregation, and local recycling. Recent waste management strategies no longer see waste as a burden but as a source of wealth. This assertion is justified by the increased activities of scavengers and waste pickers and informal waste sorting and recycling enterprises in Lugbe village. The income generated by these groups is indicative of a strong potential for generating wealth and possible job creation from waste management and recycling activities in Lugbe. In setting up an effective sustainable waste management programmes for any region, it is critical for the waste management authorities to have reliable data on waste stream characteristics such as the nature, characteristics, types and quantities of waste generated in that locality. This will allow them to choose with fair certainty the kind of management options to consider for the implementation of an integrated solid waste management programme.

Waste sorting and reduction at source are basic precept of sustainability which could be effective in the study area as the residents are willing to adopt this if given an enabling environment. Domestic waste which is largest component of waste generated in the study area

can be turned into compost manure for farmers to boost their yield, and money is thus generated from the process. The wealth potential is thus possible. There is also a need for supporting existing community initiatives/innovations in waste management and recycling through provision of incentives / rewarding systems and establishing mechanisms for maximizing benefits from the innovations e.g. value addition, and market access. This holds a strong potential for implementing Integrated Waste Management (IWM) strategies which will be of economic value and is environmentally sustainable. It is therefore recommended that the Municipal Authorities (Abuja Environmental Protection Board) should recognize waste management in urban and rural areas as a critical issue that has implications for sustainable livelihoods, climate change and air quality. There is therefore a need to lay appropriate actions that ensure sustainable waste management along the chain. Such strategies include those that reduce waste generation or those that manage waste on site through recycling waste for transformation into useful products, enforcing penalties on poor waste disposal, supporting initiatives and innovations in waste management for household incomes generation and Government authorities need to encourage existing community initiatives/innovations in waste management and waste sorting through provision of incentives / rewarding systems and establishing mechanisms for maximizing benefits from the innovations e.g. value addition, market access.

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