Impact of controlling wastes and sustainable improvement in Bwari – Abuja, Nigeria.

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Abstract-
The paper analysis waste management and sustainable improvement in Nigeria with specific reference to Bwari, F.C.T, Abuja. The area was divided into three regions namely: District A (south region), District B (west region) and District C (central region). Survey research stratagem was implemented with questionnaire as main tools applied for data gathering which were distributed to twenty-five families carefully picked randomly making total of 75 families that were studied. The main cause of waste management problem are illiteracy and income level, likewise city waste categorization for the Bwari - Abuja reveals paper, food leftovers and water sachets as the highest waste generated, but for transfer purposes, FLEXIBLE bag are regularly utilized to dispose waste since bags are stress-free in disposing and low-priced. The waste storing frequency is between 12 – 24 hours whereas waste throwing frequency follows frequently once and bi-weekly gatherings. Some respondents have open dumps within their vicinity where waste is stock before thrown away. However, there is great recycling event for metal and bottles since they are recycled at home and 15 % sell. Joint solid waste management practice in Bwari - Abuja are storing and highway or canal waste disposal whereas recycling and waste reduction which are waste minimization implements in the trio pyramid system which is the strength of most waste administration systems is faintly practiced.

Key words: Waste management, sustainability development, solid waste, Bwari, Abuja.

1. Introduction
Solid waste are the unfunctionable and detrimental goods in the solid form ensuing from the society activities [1]. The public solid unwanted (PSU) regularly alleged to contain all discarded created in municipal with the eradication of industrialized process and agricultural waste, despite main PSU sources comprises of housing, construction, institutional and commercial [2], [3]. Sustainable development have three structures: social development, financial development and environmental protection [4]. Sustainable development guarantees an advanced world with safety and healthy environment for plants, animals as well as human beings [5]. Main resolution of solid waste management is to guarantee public health protection together with environmental quality and sustainable development hence, national and local authorities must implement sustainable solid waste administration systems in strong partnership with both the public and private sector. The features of municipal solid waste is disposed thru certain matters, which encompasses of the housing, commercial, the income level, etcetera [6]. Poor waste discarding practice of the populaces, weak government by-law, bad work technique, corruption, fund deficient, insufficient facilities for instance plants and equipment amongst others are factors inspiring against operative waste management towards sustainable development in developing countries. High- income regions usually produce more inorganic materials for instance plastics
and paper while low-salary regions generate diminutive organic unwanted that were unsuitably located besides open dumpsites which introduce health exposures and disfigurement of the aesthetic magnificence of many municipalities in Nigeria [7], [8]. Hence, landfill availability, appropriate resources (Human, capital, plant, equipment and other tools) must be readily accessible for sustainable development in developing countries since there is need to safeguard future for the next generation through cleaning up of our environment from several kinds of waste and take into consideration physical and population growth of the country [9], [10], [11]. The Public solid waste management problem in Nigeria metropolises has fascinating the researchers attention such as [1], [2], [12], [13], [14], and their research outcomes point to the need for permissible and a resourceful solution to solid waste nuisance in Nigerian municipalities. Furthermore, it has been advocated that resourceful recycling and composting can save 15.5% waste management prices and 62.5% landfill costs, similarly applaud recycling approval as a footstep towards stimulating an unified solid waste management technique besides, when diverse waste categorizations are not considered during collecting and disposal, operative solid waste administration becomes problematical [1], [4], [6], [15]. This research work will cover solid waste administration in three districts within Bwari Area Council, Abuja. The research boundaries would embraces scheme features of the incorporated solid waste administration technique through joint solid waste management (JSWM) as a valuation device.

2. Methodology

2.1 Study Area

In this study Bwari, a town and class P - Populated Place in Federal Capital Territory, Abuja, Nigeria, with the province font code of Africa were selected as rural settlement illustration growing to built-up with coordinates of 9°16'60" N and 7°22'60" E. The original inhabitants of Bwari are the Gbagyi speaking populaces, but with the FCT Abuja establishment, innumerable changes ensued in Bwari, like the introduction of an Emir in Bwari. Also, it is the capital of Bwari Area Council of FCT, accommodate various public establishments like: Dorben Polytechnic, JAMB headquarters (Joint Admission & Matriculation Board), Nigerian Law School, and Veritas [Catholic] University. Being among the fastest growing built-up centers in the FCT, the population over 1.3million (one point two three million) populaces, the locations are presented in Figure 1.

![Figure 1: Map of Bwari Area council.](image)
2.2 Research Methods and Sampling approaches

The sampling structure comprises of individuals living within case study areas, data was collected through questionnaire and field investigation. The research equipment making is through JSWM which was exploited to framework the assessment regions survey content with closed housing questionnaire as shown in Table 1. The surveys was circulated using simple random analyst within each status and distributed to people in open places and gardens in the municipalities. The questionnaire used was from prior studies but it was improved to suite this analysis purpose as well authenticated by three professionals and certified through trial study and reused after improved. Figure 2 reveals field survey visits to municipal and points collection within Bwari, Abuja.

Table 1: Questionnaire format of Bwari Local Council.

| Description                        | Section | Scale Type | No of items |
|------------------------------------|---------|------------|-------------|
| Demographic information            | A       | Categorical| 12          |
| Waste management practices         | B       | Binary     | 14          |

Figure 2: Open Garbage dump within a housing area

3. Result and discussions
3.1 Demographic Analysis

Sex and Occupation

The demographic investigation (Gender and Profession) formed using the three regions Questionnaire that were dispensed to twenty households selected randomly making total of 60 families are presented in Figure 3.
Government workers (GW), Non-government workers (NGW) and Male (M) Female (F)

Figure 3: Gender and Profession of respondent in Bwari, Abuja.

B Age Group

The Age group formed using the three regions Questionnaire that were dispensed to twenty-five households selected randomly making total of 75 families are presented in Figure 4.

Figure 4: Age group for Bwari Abuja Resident

C Education

The Education level formed using the three regions Questionnaire that were dispensed to twenty-five household’s selected randomly making total of 75 families are presented in Figure 5.
D Salary

The salary formed using the three regions Questionnaire that were dispensed to twenty-five households selected randomly making total of 75 families are presented in Figure 6.

E Size of Families

Families sizes formed using the three regions Questionnaire that were dispensed to twenty-five households selected randomly making total of 75 families are presented in Figure 7.
Figure 1 – 7 indications that demographic figures (gender, profession, age, education, salary and households size) for each of the three regions, female discarded waste more than men, whereas Non-government employees discarded waste more than government employees. These results show that income and education level of the populace control proper waste management.

3.2 Waste Administration

3.21 Municipal Waste Characterization

The civic waste characteristics quantities and percentages for the waste generated using the three districts in Bwari, Abuja presented in Table 2 and graphically illustrated in Figure 8.

Table 2: Civic characteristics for Bwari-Abuja.

| Civic waste composition | Quantities (tons) | %    |
|-------------------------|------------------|------|
| Paper                   | 21,527.89        | 23.52|
| Textile                 | 3,164.53         | 3.46 |
| Plastics                | 5,628.56         | 6.15 |
| Water sachets           | 12,274.51        | 13.40|
| Glass                   | 2,548.32         | 2.78 |
| Metals                  | 2,512.34         | 2.74 |
| E-waste                 | 1,979.20         | 2.17 |
| Organic materials; food & garden waste | 37,886.21 | 41.39 |
| Other organic materials  | 4012.23          | 4.39 |

Source: [16]
Figure 8 reveals the frequency shape based on the group of waste generated. It can be absorbed from the pie chart that paper, food waste and water sachets have greatest percentages which is in agreement with paper work by [1].

3.22 Waste Storage Techniques

The storage techniques gathered using the three provinces of Questionnaire that were assigned to twenty households selected randomly making total of 75 families are presented in Figure 9.

Figure 9: Types of Waste Storage by Residents of Kubwa

Waste storage style demonstrations that storing by using sack and plastic bag are frequently since bags are easy to dispose and economical.

3.23 Storage Frequency

The storage frequency formed using the three regions Questionnaire that were dispensed to twenty-five households selected randomly making total of 75 families are presented in Figure 10.
3.3 Waste Disposal method and frequency
The Collecting and Disposal Frequency formed using the three regions Questionnaire that were dispensed to twenty-five households selected randomly making total of 75 families are presented in Figure 11.

The waste disposing frequency style follows frequently once and twice weekly, some respondents have open garbage dump within their vicinity where waste is stock and thrown away through burning or recycling which is in agreement with paper work by [17], [18].

3.4 Waste minimization (Frequency of Items Recycling)
The recycling frequency formed using the three regions Questionnaire that were dispensed to twenty-five households selected randomly making total of 75 families are presented in Figure 12.
Figure 12: Items recycling frequency by Residents of Bwari Abuja

There is a high recycling frequency for bottles and metal because they are reuse at home and 15 % sell which is in agreement with paper work by [12], [19].

3.5 Solid Waste Management Practices (SWMP)

The solid waste practices among resident formed using the three regions Questionnaire that were dispensed to twenty-five households selected randomly making total of 75 families are presented in Figure 13.

![Solid waste practices for Bwari Abuja](image)

The trend demonstrates high frequency of storage and waste dumping either highway side or canal as waste management normally practice in Bwari, Abuja. Recycling and reduction which are waste minimization performs in the trio hierarchy structure, which also form waste administration backbone is slightly practiced which is in agreement with research work made by [17], [19].
4. Conclusion
This study examined the influence of wastes management and sustainable improvement in Bwari, Abuja Northern Nigeria. Demographic figures of the three districts indications illiteracy and income level, has the cause of waste management problems similarly metropolitan waste characterization for the Bwari Abuja reveals paper, food waste and water sachets as the highest waste generated, meanwhile sack and plastic bag are frequently used to throw away waste since bags are easy to dispose besides cost-effective. The waste storage frequency is between 12 – 24 hours whereas waste discarding frequency follows characteristically once and twice weekly gatherings. Some respondents have open dumps within their vicinity where waste is stock and discarded. However, there is great recycling rate for bottles and metal because they are reused at home and 15 % sell. Public solid waste administration practice in Bwari - Abuja are storage and waste disposal on highway or canal while recycling and reduction which are waste minimization implements in the trio hierarchy structure that also form backbone of most waste administration techniques is slightly practiced.

Recommendation
There is need for constant and periodic environmental awareness programmes by means of miscellaneous communication mediums is obligatory so as to change the resident’s waste management approach. Waste reduction need to be earnestly addressed in Bwari - Abuja and stratagems need to be initiated to intensificate the recycling rate, waste minimizing and composting. Furthermore, Indiscriminate littering necessitates an upgrading collection points to miniscule transfer stations, intensifying municipal bin number in closely populous districts with daily evacuations during office hours to dodge traffic jams by haulage truck. Conclusively, institutional body must incorporate decrees and policies about environmental matters, perceptibly stated guideline for workforce and populaces to follow as well instigated, or formulated and enhanced for each portion of waste administration processes besides unified the institutions answerable for waste administration under singular body with the applicable tool put in place to expedite its appropriate function.

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