



Municipal Solid Waste Disposal and Its Environmental Implications in Wuse Zone 5, Federal Capital Territory, Abuja, Nigeria

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Abstract: Fast growing cities like Abuja are faced with challenges of municipal solid waste management. The paper examined municipal solid waste disposal methods and its environmental implications in Wuse Zone 5A, FCT, Abuja Nigeria. The study generated data from oral interviews and field observation. The findings reveal that attitudinal irresponsibility, ineptitude and graft have collectively resulted in the ugly system of solid waste disposal in Wuse Zone 5A. The study shows that the dumping of municipal solid wastes on the streets has impacted the environment negatively, some of these impacts are physical nuisance of the solid wastes to the environment, the waste collection centres serve as hideouts to rodents and other dangerous insects, the waste collection centers also emit offensive odour. The solid waste may decompose to emit methane gas, which contributes to climate change. The paper recommends that the AEPB should have adequate financial provision, public orientation and new environmental laws should be put in place, community full participation in waste management be encouraged, and a better method of waste collection be provided.

Keywords: Disposal, Environment, Solid-waste, Municipal-solid-waste

1. Introduction

The environment is a gift to humanity and permanent home to man, which is affected by human activities and natural disaster. The latter takes the form of pollution of the environment via dumping of solid/industrial waste in the environment [1]. Solid waste problem started with urban growth, which resulted partly from national increase in population and immigration [2]. The problem of municipal solid waste is a worrisome problem facing Nigeria today as a result of increase in population and urban growth. No town in Nigeria especially the urban and semi-urban centers can boast of having found a lasting solution to the problem of filth and huge piles of municipal solid waste, rather the problem continues to assume monstrous dimensions [3].

The generation and disposal of municipal solid waste is an intrinsic part of any developing society. Waste, both from domestic and commercial sources has grown significantly in Nigeria over the past decades. Every time a householder

shops at a store or market, they contribute to the mountain of waste [4]. The volume of waste does not actually constitute the problem but the ability or inability of governments, individuals and waste disposal firms to keep up with the task of managing waste and the environment. There is no doubt that a dirty environment affects the standard of living, aesthetic sensibility and public health [5]. The corollary is that improper disposal or storage of municipal solid waste can constitute hazards to the society through pollution of air, land and water [4]. Solid waste management is a global issue that is a growing source of concern in developed and developing countries due to increase urbanization, changes in consumer pattern and industrialization, which all directly influence solid waste generation [6]. Waste is defined [7] as follows:

- i.) Any substance which constitutes a scrap material or an effluent or other unwanted surplus substance arising from the application of any process and
- ii.) Any substance or article, which requires to be disposed

of as being broken, worn out, contaminated or otherwise spoiled.

Generally, waste is considered to be something which poses a significantly different threat to human health or environment, partly because of the manner in which it may be disposed of and partly because the holder no longer has the same sense of obligation in relation to it [8]. Municipal solid waste is commonly known as thrash or garbage, consists of everyday items we use and then throw away which comes from our homes, schools, hotels, hospitals and business [5]. Urban wastes are those materials that are generated, used and have no further value and are thrown away in the environment. These materials are valuable raw materials located at a wrong place [9]. Domestic waste can pollute the environment and be indirectly dangerous to humans. Some items of municipal solid waste may in themselves be harmless yet the sight is unattractive and may in time produce nauseating and rancid odour and may attract rats thus consisting a hazard to human health [10]. The continuous indiscriminate disposal of municipal solid waste is accelerating and is linked to poverty, poor governance, urbanization, population growth, poor standards of living and low level of environmental awareness [11].

Municipal solid waste is regarded as discarded materials arising from operational activities taking place in different land use such as residential, commercial, industrial and agricultural [12]. Municipal solid waste includes wastes generated from residential, commercial, industrial, institutional, construction, demolition, process, and Residential Single and multifamily dwellings generate food wastes, paper, cardboard, plastics, textiles, leather, yard wastes, wood, glass, metals, ashes, special wastes (e.g., bulky items, consumer electronics, white goods, batteries, oil, tires), and household hazardous wastes. Commercial Stores, hotels, restaurants, markets generate paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, among others [13]. Domestic or residential wastes are those that are collected from dwelling places on a regular basis, such waste include organic matter resulting from preparation and consummation of food, rags, nylon and ashes are the remains after various cooking or heating processes.

The nature and composition of solid waste is a product of climatic business activities in urban centers [14]. The composition of refuse generated in an area determines the type of disposal method suitable for a particular form of waste and the effectiveness of a collection system depends on the cooperation of the household and individuals in various sector of the city in providing containers for storing refuse in accordance with the regulation and regularly placing the materials for collection [15]. To urban and city dwellers, public hygiene starts and ends in the immediate surroundings and the city will take care of itself. The situation has deteriorated that today the problem of municipal solid waste has become one of the nation's most serious environmental problems [16]. The "government-does-everything" philosophy of many Nigerians contributes to the municipal solid waste disposal problems in Nigeria. A careless attitude

permeates the thinking especially those living in cities and towns. Self-help methods of domestic waste disposal are available and could be explored by individuals and institutions. Domestic incineration, landfill system is practicable, but most Nigerians would take to the easy way of depositing waste along the highways and street corners for government to pick up. Environment education is very necessary for improving environmental quality [17].

The need for healthy environment is important to everybody; it may differ from place to place, not in the fundamentals but in complexity [2]. Wuse Zone 5A is a busy area in the Federal Capital Territory, Abuja. The area has a market, three hotels and seven schools. These along with the residential activities contribute to the generation or enormous municipal solid wastes in the area. The Abuja Environmental Protection Board (AEPB) truck comes once daily to take the trash and almost immediately, you find heaps of thrash gathered. There is no properly structured waste disposal bin in the area. Some residents pour their waste directly on the ground at a particular spot, thus creating heaps of waste/dirt. The residents alleged that the waste bins they buy get stolen; hence they dump their dirt on the ground. Problem with the disposal of municipal solid waste in Wuse Zone 5A is caused by attitudinal irresponsibility of residents, lack of capacity to discharge duties in the part of AEPB, wrong attitude of waste generator among others. Weak public support for waste management is a serious problem.

The nature of waste disposal in Abuja is heterogeneous. Besides waste collection, no attempt is made at sorting out biodegradable wastes from non-biodegradable wastes before disposing wastes. Besides government, public understanding of waste disposal and management is limited and, in most cases, jaundiced. Graft, lack of monitoring and vested interests has prevented private involvement in the governance or management of waste disposal [18]. This paper is therefore aimed at looking at municipal solid waste disposal and its environmental implication in Wuse Zone 5A, FCT Abuja and make possible recommendations on ways to solve the problem.

2. Method

2.1. Study Area

Wuse Zone 5A is in Wuse District Cadastral Zone A03, which falls into the Phase 1 Developmental Plan. Wuse District is at the northwestern part of the city [19]. The study area experiences the Aw climate, which features a tropical wet and dry climate. Temperature in the raining season is between 23°C - 30°C and 12°C - 40°C in the dry season [20]. The study area falls within the Guinean savanna mosaic zone of the West African sub-region [19].

2.2. Materials and Methodology

Reconnaissance survey was conducted and oral interview was carried out on the residents of the study area. This enabled the researchers to have a better knowledge of the

area. Furthermore, this also enabled the researchers to determine the relevant issues to be addressed in the questionnaire and to ascertain the most appropriate sampling method and suitable statistical analysis to employ. The study adopted direct field observation; it involved interview and physical observations. The interview questions were administered on selected household. The information collected on site formed the major bulk of the data. About 50 people were randomly selected and interviewed on the vital aspects of municipal solid waste such as composition, disposal methods. Field observations of the municipal solid waste composition and dump collection centers were carried out where photographs of the various dumpsites were taken. Officers from the AEPB were also interviewed on the possibility of improved waste management plan. Other information's were obtained from the Abuja Master Plan and maps source form the Abuja Geographic Information Systems (AGIS).

3. Results

The study focused on Wuse Zone 5A, FCT, Abuja, Nigerian's capital. One notable feature that greets guest on the streets of Wuse Zone 5A is the heap of municipal solid waste. These municipal solid waste dump collection centers are sited on the major streets at various locations as shown on Figure 1 to 5.



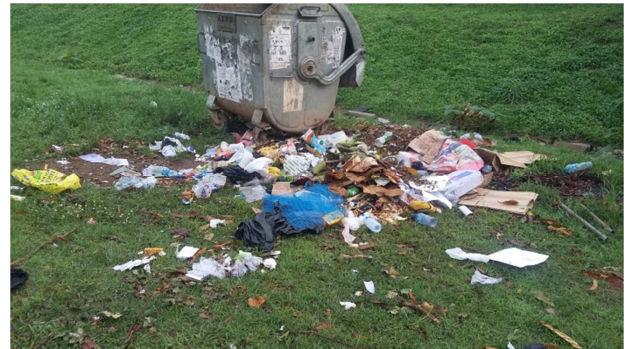
Source: Field Work (2018)

Figure 1. Municipal Solid Waste by Golden Gates Hotel in Wuse.



Source: Field Work (2018)

Figure 2. A Heap of Complex Municipal Solid Waste on Mombasa Street, Wuse.



Source: Field Work (2018)

Figure 3. Waste Dumped on the Ground Despite the Bin on the Roadside at Durola Street.



Source: Field Work (2018)

Figure 4. Poor Condition of a Waste bin on Mombasa Street.



Source: Field Work (2018)

Figure 5. Waste Dumped on the Ground on the Roadside at Durola Street.

Figure 1 to 5 shows that the composition of the wastes is very complex, they comprise of plastic materials, bottles, empty metal containers, polythene bags. High quantities of plastic wastes are generated from food and beverage containers, empty containers of bottle water, discarded electric wires, electric bulbs, and cutleries among others. There are also biodegradable solid wastes sighted among the dumps, which includes household consumable materials such as kitchen remains, discarded food items, fabrics and discarded cartons that were used for packaging. Management, either due to lack of manpower or any other reason the laws were not used or are rarely used.

Causes of the Waste Problem

There are many causes of waste problem in Wuse Zone 5A among which are:

- i. Waste disposal habit of the people.
- ii. Attitude to work.
- iii. Population growth.

4. Discussion

4.1. Waste Disposal Habit of the People

Ignorance may be adduced to the habit of the resident. A common habit noticed is that both men and women urinate on the sidewalk or gutter in full glare of the public, even when there is a “Do not urinate” sign present or where a man or woman parks his or her car and throw waste on the street, then one begins to wonder the reasons for these dirty habits of people. Nigerians are permanently accustomed to dirt [11]. Evidence of this can be seen every day by way of indiscriminate discharge of garbage into drains and at times on the highways [21].

4.2. Attitude to Work

In Nigeria, employee productivity has always been low due to certain factors including sociological factor, which is felt in the manifested lack of sense of belonging in an organization, and the tendency by employees to perceive a job as another's business. This negative attribute to work has negatively impacted on the waste management efforts of the state government poor attitude to work, poor coordination and inadequate communication among workers and the institution saddled with solid waste management responsibilities due to bureaucratic impediment and administrative hitches have resulted in chaos, confusion and ineffectiveness in delivery of many urban public services [11].

4.3. Population Effect on Waste Management

Population growth has always affected waste generation, collection and invariably disposal due to population growth and higher standards of living [12]. With many other cities in the developing world, Nigerian cities (especially Abuja) are faced with the twin problems of population increases and rapid expansion. These phenomena have no doubt brought increasing strain on urban infrastructural facilities. Population growth goes hand in hand with increased pollution and environmental decay [22].

4.4. Environmental Implication of Municipal Solid Waste in Wuse Zone 5

There are potential environment and health risks arising from improper handling of solid wastes. The built-up waste materials pose a direct health and environmental hazard to the resident, most especially children who play nearby and/or those who try to earn a living by scavenging anything of value from the rubbish heap [23]. The disposal of municipal solid waste by roadsides/streets in the study area has negative

impacts on the general environment. If the solid wastes are not managed properly, decomposition and putrefaction may take place, causing land and water pollution when the waste products percolate down into the underground water resources. Stray dogs and birds may sometimes invade garbage heaps and may spread it over the neighborhood causing unhygienic and unhealthy surroundings [2]. Another environmental effect is the offensive odour which is being emitted from the heaps of rubbish [15]. Some health implications can include flies which carry germs on their bodies and legs and also excrete them; mosquitoes breed in stagnant water in blocked drains in favourable location in cans and tyres that collects rain water; rats spreads lassa fever, and other diseases they cause injuries by biting and spoil food items. The refuse workers also faces some hazards which includes: parasite infection and infected cuts resulting from skin contact deposited metal scraps in the refuse, other includes hazards on disposal sites; are injuries from glass, razor blades, syringes, tissue damage or infection through respiration, ingestion or skin contact [11].

It is observed that municipal solid waste in the study area can decompose to emit methane a “greenhouse gas” that is more potent than carbon dioxide. This methane contributes to global warming which could result into climate change because of destruction of ozone layer [9]. The continuous increase of methane gas in the study area will surely contribute to climate change. Also, the heaps of refuse that are seen commonly in the study area have a negative impact on the beauty of the city.

Several scholars have proved that most of the synthetic materials and the e-wastes that are contained in the open roadside disposed municipal solid wastes contain toxic metals that are lethal to humans, plants and other living organisms. Vegetables tend to absorb and accumulate cadmium and lead and suggested that vegetables for human consumption should not be cultivated in areas where refuse dumps are close to, because municipal solid wastes are the major sources of these metals in our environment [24]. Heavy metals are common chemical pollutants that are easily transported and dispersed in our environment and Wuse zone 5A cannot be an exception for presence of these lethal elements. Most of the electronic and electrical fittings that are commonly seen in most of the refuse dumps in the study area contain a lot of heavy metals that are carcinogenic to humans. Heavy metals are non-biodegradable and persistent environmental contaminants which may be deposited on the surface and then absorbed into the tissues of vegetables and might be accumulated in the food chain with risks to health of animals and humans which are sensitive to metal toxicity [25]. Proper waste management should therefore be seen as a planned system of effectively controlling the production, storage, collection, transportation processing and disposal or utilization of waste in a sanitary, aesthetically acceptable and economical manner [26]. The problem in this case is not theoretical explanation/proposition but practical application, if the environment is to be saved, sanitation maintained and health improved must be paramount [18]

5. Conclusion

An efficient solid waste management is required to achieve sustainable development. Municipal solid waste generation and management is fast becoming an issue in Wuse Zone 5A due to its environmental and health implications. The study shows that attitudinal irresponsibility of the residents is a major problem of municipal solid waste management. The dumping of solid wastes by roadsides in the study area is an eyesore and falls below acceptable standard. Non-biodegradable fractions of the municipal solid wastes are the major problems in solid waste management because plastics, polythene bags and e-waste materials constitute physical nuisance of the environment. The biodegradable wastes harbour bacteria and other dangerous insects and rodents. The study therefore asks should the residents be doing more or can the government do better in managing the municipal solid wastes generated? A degraded environment cannot sustain a continued growth and it impacts negatively on the entire development of a nation.

The study is therefore recommending that there is need to enhance environmental education programmes and public participation as it affects solid wastes management not only through radio, television and print media but also through grass roots enlightenment campaigns. And also re-introduction and enforcement of monthly sanitation and sanitation/environment protection courts should be established to try all environmental pollution cases as obtainable in other jurisdictions. There is need for adequate budgetary provision for Abuja Environmental Protection Board (AEPB) for proper training and replacement of existing vehicles with modern equipment to reduce operating costs. The agency should also encourage community participation and involvement in waste management. Efforts should be made by stakeholders to evolve policies for disposal, waste reduction and recycling projects.

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