



**ASSESSMENT OF THE COMPOSITION OF SOLID WASTE IN  
SELECTED SITES OF GWAGWALADA AREA COUNCIL,  
ABUJA FCT NIGERIA.**



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**Abstract**

*An assessment of the amount and composition of solid waste generated in four selected sites of Gwagwalada was conducted in October, 2004 and March, 2005. Various types of waste generated were sampled randomly and analyzed. Biodegradable waste accounted for 93.20% of total waste generated during the harvesting season and 92.12% of total waste generated during the harvesting season and 91.12% in planting season. Of the biodegradable waste, 13303.47g was generated in dry season (harvesting) while 13286.99g in wet season (planting). T-test analyzing revealed that significant differences existed both between the type and amount of waste generated in harvesting (dry) season and planting (wet) season ( $t=0.3668; P<0.05$ ). From the above findings, it is cleared that more waste was generated during the harvest season than in planting season.*

**Keywords:** *Agricultural wastes, metals, plastics, glasses, biodegradable and non biodegradable.*

**INTRODUCTION**

Environment has been defined by different scholars and experts. Abraham (1971) defined it as the total sum of all the external conditions influencing the growth and development organisms. One of such conditions is solid waste, “a scene of most urban cities in Nigeria”. This scene of urban cities (waste) in Nigeria of recent years is characterized by the gradual take over of virtually every available open space.

Solid waste is any unwanted material resulting from industrial/domestic and commercial activities which is in liquid or solid form. These wastes are of no economic value by the generator, and must be disposed off (Eze, 1977) and Adegoke, 1990).

The history of solid waste dates back to the advent of man on earth's surface. Man in every stage of civilization generates solid waste, but the rate of generation and method of disposal varies (Adedibu, 1982). Urbanization of this due to the establishment of industries and capital cities in Nigeria has brought about a number of attendant environment problems, among which are solid waste accumulation, establishment of

institutions, by various tiers of government on how to tackle menaces in order to attain a clean environment.

The problem of solid wastes accumulation in Nigeria is attributable to poor urbanization process, (Mabogunje, 1974). In Nigeria as in many third world countries, the deposition of solid waste generated from domestic and in some cases from small scale industries is done inside designated waste dumps. The composition of these wastes varies from site to site, and depends on the peculiarities of the neighbourhood.

Solid waste which is sometimes described as one of the negative byproducts of urban environment can be processable e.g. Agricultural wastes and non-processable e.g. metals, glasses, plastics materials etc. (www.enwiki pedia.org municipal solid waste, 2004).

Most of such compounds are generally noxious, while the; leachate arising from odour in disposed sites become a major source of contamination of ground waste. Other classes of

wastes have the potential of accumulating within plants and animals which man ultimately depend on in food chain, (Poplin, 1978). With the modernization and rapid expansion of the urban cities, especially the Federal Capital Territory (FCT), Abuja and in particular Gwagwalada Area Council, management of environmental surroundings due to waste are more complex than ever before. Indiscriminate disposal of solid waste in Gwagwalada (Phase 1, Kutunku, Market Road and Dagiri towns) have posed very serious health problems to humans and made the environment uncouth for both social and recreational activities. Our environment should be kept clean because a clean environment is a pre-requisite to health and well being of our fragile planet and its inhabitants (NSI, 2007) and (WHO, 2005).

The research is aimed at assessing the composition of solid waste and its problems in Gwagwalada Area Council of the FCT with view to proffering solutions.

#### **MATERIALS AND METHODS**

Gwagwalada is one of the largest area councils of FCT in Abuja with population of about 100,000 (Population Census, 1991). It is strategically located close to the FCT, within a vast and fertile agricultural land. It lies between longitude 7°E and 7°SE and latitude 7° and 7°N. The vegetation is that of Savannah trees of the *Anona Senegalensis* and *Andropogon gayanus* species. The climate is hot, humid, tropical type. It is such that its major elements have region that are traditional from those of the southern and northern part of the country.

The marked increase in cloud cover during the month of July, August and September makes the hours of sunshine per day drop sharply to a mean of about four (4) hours (NEST, 1991).

The temperature ranges from 30.4°C and 35.1°C and 25.8°C and 30.2°C in the wet and dry seasons respectively. Onset of noon is in the middle of March and ends in around October with annual record of 1,145mm to 1,631.7mm (NEST, 1991).

#### **Sample Collection and Treatment**

The study was conducted in four selected sites (Phase 1, Market Road, Kutunku and Dagiri of

Gwagwalada Area Council (Fig. 1). Samples of waste material were collected from the four locations (each consists of three dumped sites, designed as A, B, C) in jute bags and weighed, using scale balance in bulk.

The samples were then sorted out physically into their various agricultural waste, metals, plastic, glasses and unclassified substances. Each of these were weighed separately and percentage composition of the component per sample were collected. The data collected was statistically analysed using the ANOVA, (to determine the differences between the amount of waste generated per study step), and standardized t-test to find out if there are significant differences between the wastes generated in the dry (harvesting) and wet (planting) seasons.

#### **RESULTS AND DISCUSSION**

The result of the solid waste collected from the four study sites in Gwagwalada Area Council of FCT are presented in tables 1 and 2. It was observed that in harvesting seasons, agricultural wastes recorded the highest quantities of 12300.25g (93.20%) generated in harvesting season, while 12240.37g (92.12%) in planting season. The highest amount of agricultural waste taking was 12300.25g in dry season (harvesting) and 12240.37g in wet (planting season).

Looking at the waste generated in dry season, Phase 1 had a total of 5368.3g and 5273.89g in wet season. This high percentage of waste generated was not unconnected to the fact that, the area has only one centrally located dumpsite and mostly civil servants. The next site is Market road with a total wastes generated of 5162.0g in dry seasons, and 15119.1g in wet season. Kutunku recorded a total of 1352.1g in dry seasons, and 1519.85g. This low waste generated volume was due to the fact that the site is not centrally located. Unlike Phase 1. Dagiri is equally populated, recorded a total waste of 1404.8g in dry season, while 1294.15g was recorded in wet season.

From the result, it was observed that, there was significant difference in waste types generated in dry (harvesting) and wet (planting) seasons.

**Table 1: Solid Waste Types from four selected sites in Gwagwalada town during Harvesting season in Gramme**

Waste type	Phase 1	Market Road	Kutunku	Dagiri	Total	%
Agricultural	5064.00	5020.13	1011.12	1205.00	12300.25	93.20
Metal	11.18	16.12	70.20	13.17	110.67	0.83
Paper	9.55	8.45	9.50	9.30	36.8	0.27
Plastic	22.26	21.11	60.13	22.14	125.64	0.95
Glasses	11.16	11.17	70.19	14.12	106.64	0.80
Others	250.20	101.17	131.00	141.10	623.47	4.72
<b>Total</b>	<b>5368.3</b>	<b>5162.0</b>	<b>1352.1</b>	<b>1404.8</b>	<b>13303.47</b>	<b>100</b>

**Table 2: Solid Waste Types from four selected sites in Gwagwalada town during Planting season in Gramme**

Waste type	Phase 1	Market Road	Kutunku	Dagiri	Total	%
Agricultural	018.13	5017.13	1105.00	1100.11	12240.11	92.12
Metal	15.90	11.17	70.18	11.18	108.43	0.82
Paper	7.50	8.50	9.30	8.50	33.8	0.26
Plastic	12.12	21.14	60.12	20.14	121.52	0.92
Glasses	10.14	11.16	70.15	14.12	105.57	0.79
Others	210.10	131.00	205.10	140.10	686.3	5.10
<b>Total</b>	<b>5273.89</b>	<b>5199.1</b>	<b>1519.85</b>	<b>1294.15</b>	<b>132086.99</b>	<b>100</b>

This quantities of wastes generated were calculated in percentages, and are presented in Table 1 and 2. It was clear that agricultural waste recorded the highest percentage of 92.12% in wet season and 93.20% in dry season. This was found to comprise of a large percentage of biodegradable substances, mainly yam peeling, cassava etc. This high percentage recorded, was not unconnected to the mode of life and costume of people.

This observation is in line with the findings of Izuwane (1992), who reported that biodegradable materials are usually greater than 80% of the total waste generated in most Nigeria's settlements. The recorded percentages of 0.83% for metals, 0.27% for paper, 0.80% for glasses and 0.95% for plastics are also in agreement with the estimated 2% levels for metals, plastics and papers obtained in most urban waste for low income countries USEPA (1995) (Table 1). It was clear that high population accounted for the huge solid waste generated in Phase 1 with a population of 20,000 inhabitants generate a total of 5368.30g in harvest season, and 5273.89g in planting season (Table 1 and 2). The central location of this site could be a contribution factor.

Next site with a large population is the Market road with a population of 25,000 and an average of 5162.0g in harvesting and 5199.1g in planting

season of waste was generated. Other areas with low waste generation, but equally densely populated were Kutunku and Dagiri with population of 25,000 and an average of 1352.1g in harvesting/1519.85g in planting season of wastes were recorded in these and 1404.8g in harvesting, 1294.15g in planting season sites, respectively. These areas do not have centrally located dumped sites and therefore showed high level of indiscriminate ways of dumping waste, and the sites become a breeding ground for the mosquitoes and other rodents.

Waste generated during dry (harvesting) season showed that, agricultural waste, recorded 93.20% the findings is supported with the findings of (Oluwande, 1974) who observed that waste usually vary in their quantities and characteristics with season. This also showed that the percentage of other types increases in planting season as agricultural/waste decreases.

The socio-economic importance of waste coupled with unpleasant odour, physical obstructions of human activities and the distraction of serenity of the environment have become a fertile ground or breeding of insect vectors (mosquitoes, flies) and other pests, which have constituted great danger to the inhabitants (Oduola, 1986) and Engelking (2007).

On the basis of these findings it is obvious that while waste is important to some people, it is a potential source of wealth if not properly disposed and managed.

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