REFUSE DUMP AND MANAGEMENT STRATEGY IN GWAGWALADA

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DEDICATION

I wish to dedicate this project to Almighty Allah for the gift of wisdom, patience and knowledge. Also I wish to dedicate this work to my wives and members of my family for their support and prayers.

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ABSTRACT

Due to rapid urbanization in Nigeria in the past three decades, waste management has become a major problem. Man's guided development especially in urban centers of Nigeria result in degraded urban environment and outbreak of disease such as cholera, diarrhea, etc. as it stands effective wastes in our urban centers need to be addressed to achieve sustainable development.

With regard to the study area, the classes of refuse generated include ashes, garbage, rubbish, others are street waste and carcass (dead animals).

The per capita refuse generation rate in Gwagwalada town is put at less than 0.1kg/day. The project identified three major disposal points which included within premises, refuse dumps and others. Most of the refuse generated are disposed by dumping at the riverside and by burning.

The study have also shows that over 45% of the respondents indicated that improper disposal of refuse has health hazard and other negative consequences on the people and the environment.

CHAPTER ONE

1.0 INTRODUCTION

Refuse can be disposed off either as it is or after sustainable processing by using thermal or physical means f processing method. The major reason for processing refuse is for volume reduction and for some other reasons, processing may serve to convert refuse to a more readily disposable form. As a result f low level of technology, lack of finance and high illiteracy in the developing countries, open dumps are much in practice. And the processing method is thermal where open dumps are set on fire not minding the pollution effect on the air environment.

The major aspects of refuse generation are examined. These include: sources of refused in compound, classes of refused generated, as well as the storage in the study area. Please refer to Plates 1-5, for example of open dumps and river side dumping within the study area.

Solid, liquid or gaseous disposal is seen as the final lapse of waste management. The effective waste management depends on how effective the stages are carried out. Different methods of waste disposal systems can be categorized into on-site and out-site disposal technique.

a. **On-Site Disposal**:- Here, home grinder, compactors and incineration operates like those of out-site disposal method. They are only suitable for small number of households which are generally most susceptible to pollution

because of the use of unskilled manpower. Also some methods are actually not a final disposal system. The highly notable waste disposal system include the following: Hog feeding, open dumping, incineration, resources recovery, composting and pyrolysis.

Hog feeding with waste is a form of resource recovery. In America, swine is fed with edible garbage, but with legislation that garbage should be processed before it is fed to swine. Most operator have stopped because it was found uneconomical due to the cost of materials for processing of the garbage. Hog feeding is really constrained because it cannot be used for the disposal of the non-edibles which constitute a bulk of domestic/industrial wastes.

Opening Dumping: is highly practicable in developing countries. Open dumping is the cheapest form of waste disposal but is a source of a number of health and safety problems such as diseases, air and water pollution, fire etc. Sanitary landfill is a disposal method whereby refuse is placed in trenches, abandoned mines or quarry sites after the site has been properly designed. It is the most widely used system in both the developed and developing countries. Deposited wastes are usually spread and covered with a required quantity of earth materials which are also spread and compacted after each day tips (Wilson, 1981). In order not to allow sanitary landfill to look an open dump, it needs to be strictly monitored scientifically in order to meet the criteria for eliminating or minimizing environmental nuisance such as odours, files,

fires, insects, wind blown litters etc. This includes the full utilization of available void space by good compaction of waste, minimization of problems of water pollution and gas generation and the reuse of the re-claimed land for specific purpose.

Incineration is a method of disposing waste by a controlled combustion of combustible waste at a high temperature. Refuse from collection trunks is dumped on a changing floor or in a storage pit from where the refuse is transferred into the furnace in which temperature and draft are carefully controlled to assumed completed combustion. The ashes from the incineration need to be disposed into the landfill area. On the contrary the difficulty in the use in most developing countries is its high capital and operation costs, the need for highly skilled manpower and technology to effectively manage it and the possible air-pollution and fire hazard if not properly managed (Dechirra, 1975).

Resource recovery is the process of turning what has been considered as waste into useful product for use. Wilson (1981) observed that we are going into the period of energy crisis and the possible way of remedying the situation is the process of converting what are considered waste and other sources of biomass to useful materials. In this regard, different methods are employed for resources recovery.

In composting, refuse can be buried with or without light soil to produce humus that could be used as fertilizers, carbon dioxide, water and

heat. The standard compost practice is not carried out in developing countries. Even the developed countries that practice the method are gradually withdrawing from the practice due to the disadvantages such as difficulties in separating the organic and inorganic materials, transporting the compost to farms and separating it is usually expensive and it can lead to offensive odours if not properly handled. This method is less expensive.

Pyrolysis though not practiced in developing countries is a technique of thermal decomposition of organic materials in the absence of oxygen and is seen an alternative to incineration. The by-products of pyrolysis are organic and inorganic solid oil and gases that can be used as fuel and are marketable. Pyrolysis has advantages over incineration because it produces more energy than it consumes and it does not produce files and slaps.

Recycling of refuse and other waste is currently the most pursued method of waste disposal. The materials are sorted out before recycling can be carried out effectively. Transportation is a major factor in the realization of recycling, and can adversely affect the willingness of manufacturers to use the second grade raw materials if the cost is high. Waste materials like glass, paper, plastic-tyres etc. can be recycled into such products.

Okoli (1986) aptly stated, ".....whilst the developed countries experiment at the desirability of refuse recycling and reclamation the practice,

is to a very high degree in the poorer parts of developing world.... not done as parts of any national disposal plan but scavengers and beggars...."

1.1 Statement of Problem

The volume of solid waste have assumed an alarming proportion that constituted a dam in most of our cities and Local government Headquarters thereby rendering the road almost inaccessible. Improper disposal of refuse has health hazard and other negative consequences on the people and the environment. Open refuse dumps in most parts of the country have become breeding grounds for mosquitoes, flies, rats and other diseases.

Above are some of the serious problems facing the study area. This project work will attempt to find a lasting solution to the problem.

1.2 Aims and Objectives

To observe the challenges posed by the modern solid wastes disposal systems. Within this general aims, the specific objectives are:-

1. To identify the nature and composition of solid waste in the study area.
2. To look at sources and different types of solid wastes within the study area.
3. Identify the consequences of improper disposal of refuse in the study area.

4. To suggest ways of controlling the problems.

1.3 Justification

The project work will attempt to identify the sources and nature of solid wastes and the modern management strategies. The study is expected to encourage serious research to trace the nature of health and other hazards resulting from the improper disposal of refuse by the common practice of open dumping. More especially, research into alternative to polythene bags should be conducted to create public enlightenment and improve public attitude to refuse management.

1.4 Scope

This project work seeks to cover as much as possible the issues associated with refuse generation, collection and disposal within Gwagwalada town. Included are sources and the effects of improper disposal of solid wastes to people and the environment.

1.5 Structure of Project

The project consist of six chapters; chapter one contain introduction, statement of problems, aims and objectives etc. while chapter two deals with study area , chapter three deals with literature review. Chapter four discusses methodology, sources of data, population and sampling etc. Chapter five focuses on result/field work and finally, chapter six sum up the findings, recommendations, conclusion and references; thereafter comes the appendix.

CHAPTER TWO

2.0 HISTORICAL BACKGROUND OF THE STUDY AREA

2.1 FEDERAL CAPITAL TERRITORY INTRODUCTION

The need for Nigeria to have a new capital city became necessary due to obvious problems of Lagos such as poor topography, limited land mass for development, congested traffic congestion, inadequate housing, environmental pollution and pressure of being a state capital and federal capital at the same time.

This is aside the natural location of Lagos as the major entry port for international trade.

To examine and advice on this national predicament, the Federal Government on August 9, 1975 appointed a seven man committee headed by Dr. Akinola Aguda to look into the problem and proffer solution. The committee in its final report recommended the relocation of the capital from Lagos to Abuja on the 3rd February 1976.

General Murtala Mohammed told the nation that government had accepted the justice Aguda-led panel's recommendations in its totality. From that day the logistics for construction work on F.C.T. commenced.

2.1 ADMINISTRATIVE SE UP.

The Federal Capital Territory was carved out of there neighbouring states, Niger State, old Kwara State and Plateau State. The are which now

constitutes the Federal Capital Territory, groups together people of different cultures and traditions from all over Nigeria.

In order to meet this need and to ensure adequate provision of social services, the Federal Government considered it essential to set up an effective administration in the Federal Capital territory that permeated to the grassroots. The territory was to that extent divided into six Area Councils namely, Abaji, Kuje, Kwali, G/Lada and Municipal Area Council.

Elected Chairmen and Counsellors head these area councils.

2.1 ·2 THE STUDTY AREA. GWAGWALADA AREA COUNCIL.

The area council is easily accessible from any direction of the federation. It is bounded in the North by Niger State, in the east by the Municipal area council and Kuje area council and in the south by Kwali area council. Due to the daily influx of people from all parts of the country in search of employment, the population should be in the range of 160,000 to 200,000 by now.

The land is fertile, Yams, Potatoes, Beans, Bananas and Rice are produced here. A lot of commercial quantity of mineral deposits that make the area the industrial zone of F.C.T. Some of these minerals are red clay, tin, columbite etc.

Gwagwalada town is a fairly developed area within the Federal Capital Territory (FCT). Although at present there are no industries, yet there exist in the study area, commercial banks such as United Bank for Africa (UBA),

Peoples Bank of Nigeria and other Banks. There also exist in the area, Post Office, NITEL to facilitate network from the area. Further, the town can boast of a good number primary institutions notably the presence of secondary schools, such as Government Secondary schools, Gwagwalada, a college. The University of Abuja is also located at Gwagwalada. The town has many blocks of offices which are extension of Federal Government Ministries.

The major roads in the study area are tarred and both pipe borne water and electricity supplied by NEPA Plc and Water Board respectively are enjoyed in the town save for few occasions where their supplies are disrupted for technical reasons. The study area also has a good number of health care institutions owned by the government such as the Gwagwalada Specialist Hospital. There are other private hospitals and clinics. There is also the presence of social centers such as Gwagwalada Youth Centre etc. Mention must be made also be seen as a place where both petty and commercial trading in is vogue. This includes the main market that facilitates easy interaction of both buyers and sellers of both agricultural produce and finished goods.

There is no doubt of a reasonable development in the study area and there is also evidence of the fact that the study area would continue to witness more development as a result of its nearness to Garki.

2. Climate

Gwagwalada, like the rest of the West African sub-region has its climate influenced largely by two dominant air masses. These are the dry and

dusty tropical continental air masses and the warm moist tropical moisture air masses. There is dynamism in the climatic condition, which determines the nature of the rainfall regimes, the temperature and the wind.

2.2 Temperature

The highest temperature always tends to occur at the end of the dry season close to the spring equinox thus, March has the highest temperature of about 30Oc, the lowest temperature occur in the middle of the dry season in December / January with an average of about 25.5oC, when outgoing radiation is encouraged by low humidity clear sky and longer nights. The lowest monthly mean temperatures of the year occur in the middle of rainy season (August) of about 26oC when daily minimal temperature is low.

2.2 Humidity

In the dry season, there is a decrease in relative humidity from south to north caused by the higher elevation in the north. In the rainy season, the variations differ.

In the study area, the relative humidity shows a marked decrease from the early morning to the afternoon throughout the year. For example, in the month of January, the relative humidity is 80% in the morning, compared to that of the afternoon with relative humidity of about 30% throughout the year.

2.3 Topography

The topography of Gwagwalada is made up of the gentle undulating terrain with gentle slopes.

2.4 LandUse

Majority of the indigenes of the study area are civil servants while minor number of the indigenes engage in either commercial activities such as trading, handcrafts, etc. Others earn their living as farmers, bankers, etc. while most of the people in Gwagwalada travel to Garki on daily basis.

The settlement has expanded greatly and now experiencing tremendous growth in population and area coverage. Direction of growth tends towards Giri-Zuba and toward Kwali. Moreover urban renewal is being affected gradually in the core area by individual house owners, community projects and users and the local government assistance to revamp the core

area by providing good access, drainage, refuse containers and a host of others determined programs and projects. The area is part of south-guinea savanna.

The prominent vegetation type is park savanna which is characterized by a discontinues canopy shades. Among the common trees are the oil bean trees, the sheabutter trees, the locust bean trees and the isober line trees.

CHAPTER THREE

3.0 LITERATURE REVIEW

Over the past twenty years, Nigeria has witnessed rapid economic growth. As we all know, "growth does not appear everywhere at the same time; it manifest itself in a point or 'poles' of growth; with variable terminal effects for the economy as a whole" (Perroux, 1950). Certain regions of the nations thus became better favoured than others so that as a consequence there was tremendous urban growth with a shift in development from rural to urban areas. This growth in population has given rise to the raising mountains of garbage which now characterize most of our towns and cities. In the case of refuse, its collection an ! disposal have become the most glaring problem in our urban areas which have defied solutions by both military and the civilian administrators since Nigeria's independence. In fact, this problem with its impacts on human life and property value in Nigeria has become increasingly worse and, to the critical observer, not much would seem to have been achieved in spite of huge investment of financial resources. Again the volume of waste generated by the populace in any city, town or village is directly related to the population density (Owuru, 1995; Ojikutu, 1994; Falomo, 1995). Lagos is a case in point where two-thirds of her gutters have become "open sesame" part dumping grounds, part peeing and

defecating places. Many gutters in Mushin, Ajegunle, Idi-Araba to mention only notorious cases are not cleared for years (Osuji, 1994).

The mental attitude of our urban dwellers also constitutes a major constraint to the effective implementation of existing waste management policies of government. Falomo (1995) identified two broad categories of Nigeria urban populace on the basis of their mental attitude viz:

i. The unconcerned elite who have an "out-of-sight -out - of-mind" attitude towards piles of waste which they drive past on the streets en-route their offices.

ii. The ignorant poor who have an attitude of helpless resignation to living with filth.

At the end, nobody does anything with regard to motivating the waste disposal authorities into action and the problem therefore lingers on part of wastes management in Nigeria urban areas are due to poor attitude exhibited by staff of the disposal authorities. Many people have often complain to having been compelled by law to remove waste from drain, gutters and from their general surroundings, only to find the pile still constituting an eyesore two weeks later, or until the next rainstorm washes the pile of rubbish back into the open drains. As a result, they have chosen to be altogether lawless in dodging the supposed compulsory sanitation exercise conducted once a month. This negligence on the part of the government authorities is typified in the case of Lagos where in the 1980's three fancy giant incinerators were

built and nobody seemed to know how to use them. The sites of these incinerators at Isolo and Oshodi, oworonsoki have become traditional dump sites and no a tempt is made for the further treatment of the wastes (Osuji, 1994; Falomo, 19950.

A disturbing matter about waste management problem is that its ineffectiveness is mostly impacted on the poorer urban dwellers. While the affluent urban dwellers for instance are capable of insulating themselves from the hazards of the environment by creating their own sanitized and comfortable micro-environment, which include but not limited to, fully air conditioned home, clean, filtered and uninterrupted supply of drinking water, regular collections of refuse from their immediate surrounding, the poor masses are allowed to live and die in an environment which is the cause of their early death. Ojikutu (1994) showed the helpless state of the poor when he likened their plight to the preface to George Bernard shows 'major Babara' which says "let him be poor ...let his habitations turn our cities into poisonous. conquerors of slum. Let the understanding becomes still less deserving".

3.1 Urban Waste Management by all

The need for women involvement.

There is need for public participation in waste management i.e. a total involvement of the ultimate generators of waste management process. As it is till today, the planning and technology for sanitation and waste management

have been in the hands of men. This is far from being proper and fair since women constitute about 50 percent of the population of Nigeria (Sridhar, 1996). The rational for women involvement can be seen from the following lines of reasoning.

1. At the household level, women take many decisions on domestic issues that affect the household, e.g. water needs, farm produce, nutrition and health issues. They will therefore be in a better position to suggest the most appropriate technology and ways for handling various types of household wastes.
2. A good number of women (although more in the rural than in urban areas) serve purely as housewives i.e. they don't engage in any other job than to attend 'home' environment year round, they should be more reliable caretakers of the environment.
3. Women, especially in recent times have proved to be good technicians in day-to-day maintenance of domestic appliances and equipments (Sridhar, 1996). They should not be left out in the field of waste management.
4. Leachate (water which has come into contact with wastes) pollute ground water and also affects food chain, health and human environment. Both women and children are victims of pollution. In fact, some 40,000 children die from diseases and other epidemic every day due to our bad waste disposal habits (Aina, 1995). There is

therefore the need for effective involvement of women in waste management practices.

3.2 Waste As Wealth

Waste do not mean useless or altogether worthless substances, as one waste, here may become a feedstock or raw material elsewhere. Piles of refuse in dump sites especially in our urban centers are filled with plastics and other recyclable. Little wonder than they have been christened 'Scavengers' paradise (Osuji, 1994). Each time, tens of these scavengers could be seen foraging directions need to be clamouring at every fresh truck load. Steps in the positive directions need to be taken to reconvert these wastes to wealth. To be able to achieve success in doing this, waste should be separated into their various components right from the generation stage.

Considering the chemical composition of various organic wastes, their value in nutrient levels places us at a vantage position in the consideration of composition as a waste management option. Some of the valuable waste and their nutrient levels are given below.

Table 3.1: Nutrient Value of Various Organic Wastes

Waste	N	P	K	Ca	Mg
	(Kg available when applied at 1 ton per ha)				
Refuse	13.50	8.0	14.69	6.23	2.86
Poultry	21.80	11.2	6.0	6.2	2.4
Piggery	19.00	8.4	15.51	5.2	5.2
Cattle	13.33	3.31	22.4	10.0	5.51
Horse	14.40	2.80	4.31	8.6	2.51

Sources: (Adopted from Women in Waste Management by Sridhar, 1996)

For more efficiency in the conversion of our waste to wealth, the study recommend the privatization of solid waste services. This is based on the results of the above data and the longstanding reputation of the private sector as progressive and innovative managers of service oriented enterprises (Falomo, 1995).

CHAPTER FOUR

4.0 METHODOLOGY

For the purpose of collecting information for this project work, the following methods of collecting information would be adopted.

a. Oral interview/field work

b. Researches from text books and relevant journals

c. The use of questionnaire

4.1 Sources of the Data

Data are collected from the responses from people who filled and returned their questionnaire forms, ground truth assessment and the oral interview conducted within Gwagwalada town.

4.2 Population and Sampling

The questionnaires were distributed to people living in Gwagwalada town using random sampling of the population with particular attention to the core area. The scattered populations were chosen because closer information needed to be received on the situation of waste management in majority of the study area accommodates most students admitted by the University of Abuja.

4.3 Data Analysis

The data collected were analyzed through the use of percentages and tables. The data from the questionnaires will be tabulated. The data will then be used for various discussions on the result.

CHAPTER FIVE

5.0 DISCUSSION OF RESULT

A total of 100 questionnaires were sent out to respondents and 94 completed questionnaires were returned, representing 94% of the total number of questionnaires sent out. The responses are as follows:-

Question 1: Which of the following wastes are more generated in your house?

Table 5.1: Household Waste Generated

Response	Figure	Percentage
Farm products	6	6.4
Domestic waste	62	66.0
Others	26	27.7
Total	94	100

Source: Compiled by the author

The study identified three different sources of refuse generation in the study area. These are domestic waste, farm products and others such as combination of cook and farm products, or plastics, polythene bags etc. From this results, it was deduced that 66% of the respondents generate their refuse from cooking while only 6.4% from farm products and 27.7% is from other sources. This suggests that waste from cooking is the major source of refuse

in compounds of the study area. This might not be unconnected with the fact that one cannot survive without eating food and in the process remnants of food are generated as refuse.

Table 5.2 Classes of Refuse Generated

Classes of Refuse	Frequency	Percentage
1. Ashes	9	9.6
2. Garbage	20	21.3
3. Rubbish	12	12.8
4. All of the above	11	11.7
5. Others	94	100

Source: Compiled by the author

From table 5.2 above, it can be observed that only 9.6% of the respondents generate their refuse from ashes, about 21.3% from garbage, 12.8% from rubbish only. In all, 47.7% generate their refuse from all the three categories of refuse mentioned above, other types of refuse (which could be a combination of any two or more of the four types) account for 11.7%. Further discussions with an official of Gwagwalada Area Council and Health Department indicate that apart from the classes of refuse mentioned above, other classes of refuse generated include street wastes such as leaves, paper etc. and carcass (dead animals). However, carcass constitutes negligible percentage. It was also observed that dumped refuse provide a breeding place for dangerous insects and rats which transmit various diseases.

Question 2: How do you handle household wastes?

Table 5.3: Handling of Household Waste

Response	Figure	Percentage
By throwing them away	54	57.5
By storing them in dustbins	40	42.5
Total	94	100

Source: Compiled by the author

Wastes generated from Gwagwalada town are largely thrown away instead of being stored before removal. About 57.5% of the total wastes generated are simply thrown away indiscriminately. This also indicates that the use of dustbins is not in practice. About 42.5% of the respondents store their wastes before they are collected for final disposal.

Question 3: How regular are wastes removed from dumping sites?

Table 5.4: Regularity of Dump removal

Response	Figure	Percentage
Immediately wastes are dumped	05	5.3
Not removed at all	74	78.7
Removed after several weeks	15	16.0
Total	94	100

Source: Compiled by the author

Table 5.4 above indicates that the bulk of wastes dumped at the various site with most of the wastes are dumped by the riverside while others are left unattended to. The table shows that about 78.7% of waste dumps are not removed for a long time. About 16% refuse dumps are removed only after several weeks. Those removed immediately accounted for just 5.3% of the total respondents.

Table 5.5: Increase of Waste Generated

Response	Figure	Percentage
Rainy season	72	78.7
Dry season	20	21.3
Total	94	100

Source: Compiled by the author

Of the whole wastes generated within the study area, 78.7% is in the rainy season. This might not be unconnected with the additional agricultural wastes that are abundant during the period. Whilst only 21.3% is generated during the dry season.

Question 5: People do not use dustbin due to

Table 5.6: Lack of government dustbins

Response	Figure	Percentage
Poverty	31	13.7
Ignorance	21	22.3
Not provided by government	62	64.0
Total	94	100

Source: Compiled by the author

Majority of the people in the study area constituting about 66% of the respondents have indicated that people do not use dustbin because they were not provided by the government. This is followed by 33.7% of the respondents who attribute the lack of usage of dustbin to poverty. The remaining 22.3% attribute it to ignorance.

Question 6: People can assist in proper waste management by:

Table 5.7: Proper Waste Management

Response	Figure	Percentage
Throwing the waste everywhere	28	29.8
Storing dustbins	66	70.2
Total	94	100

Source: Compiled by the author

About 70.2% of the respondents have shown that the use of dustbins is the best way to help in waste management. About 29.8% of the respondents however indicated that throwing the wastes is the best way to deal with solid wastes. This indicates that majority of people will use the dustbins if provided by the government or if they can afford to provide for themselves dustbins that can be regularly evacuated.

Question 7: How can the government improve waste management?

Table 5.8: Improvement of Waste Management by Government

Response	Figure	Percentage
Early removal of wastes	64	68.0
Increasing public awareness	30	32.0
Total	94	100

Source: Compiled by the author

Table 5.8 above indicates that about 68% of the respondents in the study area have indicated that government can improve the waste management by quick removal of solid wastes from the dumping sites. This has shown the level of disturbance heaps of refuse constitutes to the people in the study area. The remaining 32% response means that people do not see public awareness as important as immediate removal of waste from dumping sites.

Question 8: Which is the best way to dispose off solid wastes?

Table 5.9: Best methods of solid waste disposal

Response	Figure	Percentage
Burning	34	36.5
Dumping into the bush	40	42.2
Dumping into the river	20	21.3
Total	94	100

Source: Compiled by the author

About 42.2% of the respondents in the table 5.9 above have indicated that dumping the solid waste into the bush is the best way to dispose off solid wastes. This is an indication that more people are aware of the dangers of having large heaps of wastes around them. Some people (21.3%) want the solid wastes dispose off in the river as a way of getting rid of it. While 36.5% opted for burning.

Question 9: Which of the following hazards is more disturbing at dumping sites?

Table 5.10: More disturbing Hazards

Table 5.9: Best methods of solid waste disposal

Response	Figure	Percentage
Physical injury	10	10.5
Offensive smell	14	15.0
Smoke nuisance	70	74.5
Total	94	100

Source: Compiled by the author

In table 5.10 above, the respondents believed that smoke nuisance at dumping site is more injurious. This is because every household near dumping sites are uncomfortable due to the smoke nuisance as can be seen in the table. While 15% of the respondents are of the view that offensive smell from the dumping sites is more disturbing. The remaining 10.5% claimed that physical injury is the most disturbing hazard at dumping sites.

Question 10: Which of the following is more disturbing effect of smoke nuisance?

Table 5.11: Effect of smoke nuisance

Response	Figure	Percentage
Reduce visibility	15	16.0
Breathing difficulty	62	66.0
Eye irritation	17	18.0
Total	94	100

Source: Compiled by the author

The largest number of respondents constituting 66% indicated that difficult in breathing is the most disturbing effects of smoke nuisance from dumping sit. Eye irritation comes next with 18% of the respondents in support while Breathing difficulty comes last as the most disturbing effect of smoke nuisance and support by about 16% of the respondents.

Question 11: Which of the following acts causes the blockage of drainage

Table 5.12: Blockage of Drainage

Response	Figure	Percentage
Solid wastes filling into drainage from dumping sites	65	69.2
Wind blowing wastes into drainage	05	5.3
People directly dumping wastes into drainage	24	25.5
Total	94	100

Source: Compiled by the author

About 25.5% of the respondents in Table 5.12 believed that drainage in Gwagwalada was blocked by refuse directly thrown into them by the people while 5.3% believed that the waste in drainage are blown in by the agent of wind. 69.2% of respondents see the blockage to be due to direct filling of wastes into the drainage from dumping sites thereby resulting in blockage. In most cases refuse dump extend towards drainage system and block the passage of water.

Question 12: Which of the following may happen due to the blockage of the drainage?

Table 5.13: Consequences of blockage of drainage system

Response	Figure	Percentage
Offensive smell	4	4.3
Flooding of surrounding areas	90	98.7
Total	94	100

Source: Compiled by the author

Table 5.13 indicates that about 4.3% of the respondents said there will be offensive smell as a result of solid waste blockage of drainage system while 98.7% which constitutes more of the people claim that flooding of the environment will be the result if drainage system is blocked.

CHAPTER SIX

6.0 FINDINGS, RECOMMENDATION AND CONCLUSION

6.1 Findings

The effect of improper disposal of refuse on people and the environment generally has long been recognized. In this study, over 45% of respondents indicated that improper disposal of refuse had health hazard and other negative consequences on the people and the environment.

Open refuse dumps in most parts of the study area have becomes breeding grounds for mosquitoes, flies, rats and other diseases. Some of the major effects of refuse include the followings:

Odour:- This arises as a result of combination of rotten vegetable and other refuse that are indiscriminately discarded. When this situation persists all day and night, it constitutes a major environmental nuisance. Some passerby and indeed people living around such environment do find this unattractive; others consider it a revolving stink.

Insects and Rats:- Refuse dump also attract both insects and rats which are dangerous and can transmit various diseases using refuse dump as their breeding ground. Disease such dysentery, diarrhea and a host of others are largely brought by insects while plague, typhus, leptispirosis, histoplasmosis, rat bit fever, and many other diseases are the products of rats. They destroy

almost everything that they get access including furniture and foodstuff (Field work).

Atmospheric Pollution:- When refuse is burnt in the open place, a pull of dense black smoke often covers the site and neighbouring land so that its position can be located from a distance. Tables 5.10 and 5.11 respectively indicated that the smoke nuisance is more hazardous at the sites and often causes irritation. Apart from particular matter that constitute smoke gaseous discharges from incomplete combustion may include sulphur dioxide (SO_2), nitrous oxide and various others which are dangerous to health.

Pollution of water resources is also another inherent character of disposal of refuse in open area.

Environmental Degradation:- Huge dumps of refuse and indiscriminate manner in which people tip refuse has become eyesores to member of public. It destroys the scenery of the environment. It also becomes a source of psychological disorder.

If tourism is an important revenue base to the economy, such aesthetic nuisance may reduce the number of visitors with resultant economic loss. Increase of flies and rats and wind blown dust, paper polythene bags and plastics are all harmful to the locality.

Furthermore, the project work has shown that dustbins are not in use (see Table 5.3), neither by the households nor centrally by the community. This reason contributes to the general filthy condition of the study area. If all

wastes are carefully stored in dustbins whether household or community based and the wastes are subsequently collected and disposed off, solid wastes will not have littered everywhere as it is now. Apart from the reason given in Table 5.6 which is non provision of dustbins by government, the issue of poverty is also strongly part of the cause of non usage of dustbins by the people.

It is worthy of note that, although one may wonder whether refuse has got any importance because of its nature. It is significant to note that some people depend on refuse as their source of income. Refuse is important for among others reclamation of land, source of manure, animals feeding, it is also recycled for usage.

6.2 Recommendations

In order to ensure an effective waste management and basic sanitation in urban cities and rural areas in Nigeria, a separate department to be called Environmental Safety Department need to be created whose responsibility is to educate both the public and health or sanitary inspectors on how to dump wastes and the appropriate method in disposing them.

Second'y, these departments at Local and State levels should always organize lectures, symposium etc. to the sanitary workers on how to ensure adequate safety while on duty. Added to these, weekly or monthly magazine entitle "you and your waste" should be launched by the three tiers of government and interpreted at and interpreted at different ethnic languages

in Nigeria. This will guide the public and the sanitary workers on how to dump and collect or dispose wastes respectively.

Moreover, the period for refuse collection must be changed. Instead of the usual morning, afternoon and evening time, night period is recommended. This will prevent traffic jam caused by the refuse collection vehicles in Nigerian town s and cities. Other recommendations are:-

(a) Providing enough funds to the Local Government Health Departments saddled with the responsibility of refuse collection and disposal with general sanitation, for purchase of working materials and staff welfare.

(b) Ensuring that sanitation should not necessarily be on sanitation days alone but always.

(c) Introduction of reward to the cleanest wards

(d) Encouragement of NGO's to participate actively in sanitation activities.

(e) Government should look into the possibility of establishing a polythene bags recycling plant to take care of the growing number of polythene bags littering the streets and dumps.

(f) Some serious research is needed to trace the nature of health and other hazards resulting from the improper disposal of refuse by the common practice of open dumping more especially, research into alternative to polythene bags should be conducted.

(g) All efforts should be intensified by both government and non-governmental organization in creating the environmental protection

awareness level of the public. This will help change the culture of sanitary leveling in many town and cities.

(h) More resources should be mobilized and channelled towards the recycling and reuse of recyclable waste item. It therefore also mean that the public need to be educated to separate wastes into their various components right from the point of generation.

6.2 Conclusion

In order to maintain good and healthy environment in Nigeria cities and rural areas, the Federal, State and Local Government should ensure that refuse generated are properly dispose off by the sanitary workers. Also the above recommendations are complementary to other peoples recommendations.

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APPENDIX

QUESTIONNAIRE ON SOLID WASTES MANAGEMENT IN GWAGWALADA TOWN

Dear Sir/Madam,

The questionnaire is designed to obtain some information on the solid wastes management in Gwagwalada town. You are to answer the questionnaire below. I wish to assure you that this is simply an academic exercise and all information given will be treated confidentially.

You are to tick the correct answer from the following questions:-

1. Which of the following wastes are more generated in your house?
   a. Farm product
   b. Food particles
   c. Others

2. How do you handle household waste?
   a. by throwing them away
   b. by storing them in dustbins

3. How regular are wastes removed from dumping sites?
   a. Immediately wastes are deposited
   b. Not removed at all
   c. Remove after several weeks

4. When do you observe wastes increase in Gwagwalada
   a. During rainy season
   b. During dry season

5. People can assist improper waste management by
   a. Poverty
   b. Ignorance
   c. They are not provided by government

6. People can assist in proper waste management by
   a. Throwing the waste anywhere
   b. Storing in dustbins

7. The government can improve waste management by
    a. Early removal of waste
    b. Increasing public awareness

8. Which is the best way to dispose off solid wastes?
    a. Burning
    b. Dumping into the bush
    c. Dumping into the river

9. Which of the following hazard is more disturbing at dumping sites?
    a. Physical injury
    b. Offensive smell
    c. Smoke nuisance

10. Which of the following is more disturbing effect of smoke nuisance
    a. Solid wastes falling into drainage
    b. Wind blowing waste into drainage
    c. People directly dumping waste into drainage

11. Which of the following acts causes the blockage of drainage
    a. Solid wastes falling into drainage from dumping sites
    b. Wind blowing wastes into drainage
    c. People directly dumping wastes into drainage.

12. Which of the following may happen due to the blockage of the drainage?
    a. Offensive smell
    b. Flooding of surrounding areas