

WASTE COLLECTION AND DISPOSAL

(A CASE STUDY OF KUJE LOCAL GOVERNMENT AREA – ABUJA)

BY

GABRIEL A. BABA

PGD/GE0/2001/255

Department of Geography
School of Environmental Managements
Federal University of Technology,
Minna,
Niger State, NIGERIA

The project is submitted to the Department of Geography
In partial fulfillment of the Requirement for the Award of
Post-Graduate Diploma in Environmental Managements
Federal University of Technology, Minna.

DECEMBER, 2003

DECLARATION

I hereby declare that this research project has been conducted by me under the guidance of **Dr. (Mrs.) A.E. Odafen** of the Department of Geography, Federal University of Technology, Minna, and have neither copied someone's work nor have someone else done it for me.

Credit has been given to writes whose works have been referred to in the project.

GABRIEL A. BABA

DATE

CERTIFICATION

This is to certify that the project titled "THE WASTE COLLECTION AND DISPOSAL, A CASE STUDY OF KUJE LOCAL GOVERNMENT AREA – ABUJA" is an original work undertaken by GABRIEL A. BABA PGD/GEO/2001/255 and has been prepared in accordance with the regulations governing the preparation and presentation of projects in Federal University of Technology, Minna.



Project Supervisor



Date

Co-ordinator

Date

External Examiner

Date

DEDICATION

Dedicated to the countless number of youths who desire sound education but are incapacitated. There is yet hope.

ACKNOWLEDGEMENT

Special appreciation to God Almighty who is my inspiration and reason for all I am, do and have.

Also to great persons who encouraged me in this noble pursuit, my parents - Mr. and Mrs. Patrick Baba, my brothers and sisters.

To my dear friends Ngozi and Stella, you were insistent on my carrying on to the end.

My lecturers especially Dr. Akinyeye, my supervisor- Dr Odafen, fellow students especially Abiola for being there. Thanks a lot.

Finally to my Boss Arc. L.D. Abalaka, for your encouragement.

I am eternally grateful.

TABLE OF CONTENTS

	Page
Title page	i
Declaration	ii
Certification	iii
Dedication	iv
Acknowledgement	v
Table of Contents	vi
Abstract	vii
CHAPTER ONE	
1.0 Introduction	1
1.1 Background of Study	1
1.2 Research Questions	2
1.3 Statement of Problem	2
1.4 Purpose and Significance of Study	3
1.5 Objectives of the Study	3
1.6 Scope and Limitation of the Study	4
CHAPTER TWO	
2.0 Literature Review	5
2.1 Definition of Waste	5
2.2 Introduction	6
2.3 Sources of Waste Generation	7
2.4 Waste Disposal	9
2.4.1 Storage	11
2.4.2 Communal Storage Unit	11
2.4.3 Collection and Transportation	12
2.4.4 Waste Disposal Strategies	12
CHAPTER THREE	
3.0 Research Methodology	14
3.1 Methods of Data Collected	14
3.2 Sampling Procedures	14
3.3 Data Analysis	16
CHAPTER FOUR	
4.0 Discussion of Result	17
4.1 Ground Assessment	24
4.1.1 Erosion	25
4.1.2 Health Related Hazard	25

CHAPTER FIVE

5.0	Summary, Conclusion and Recommendations	28
5.1	Summary	28
5.2	Conclusion	30
5.3	Recommendations	30
	References	31

ABSTRACT

This study examined critically the findings from the survey conducted on waste collection and disposal system for the study area, Kuje Local Government, FCT, Abuja. From the survey the information that was used, were the same problems associated with waste generally.

Furthermore, the information revealed that these problems are detrimental to the public and the local government area. Accumulations of waste, inadequate transmission of waste and disposing of them are causing these problems. However, it was found out that dumping of refuse anyhow has an adverse effect on man and the environment (environmental degradation).

Our findings suggest that the Board in charge should provide appropriate collection centers for the entire people of Kuje Local Government, because most of the problem occurred as a result of lack of collection centers, lack of bins in the appropriate areas to ease collection and disposal of waste.

CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND OF THE STUDY

It is all known the method approach to the disposal of our waste and lease of all with the pollution resulting from inadequate waste management. The study area under research has shown that the area has been dumping areas for solid waste, but poorly controlled. Hence there is no reliable agent or organization in charge of collection and disposal of waste, which lead to careless dumping of waste, thereby causing a lot of problems such as blockage of drainages, roads, flood, land degradation etc.

The solid wastes are mainly collected in a few located at various centers by the local government area. Some use drums, rub ber arms, then taken away to the out sketch of town, village and whenever they forms heaps, they are burnt down either through bush burning or set fire on it by the staff from Health Department of the Local Government Area.

Problems faced by the inhabitants in the disposal of waste in the study area is lack of facilities, such as vehicles, enough dust bin, sanitary inspectors in doer to facilitate the waste disposal elsewhere.

When this solid waste are being dumped and burnt on the out sketch of the town, they emit gas into the atmosphere such as H_2S , CO, N_2O , etc. When it reacts atmospheric particles, they pollute the environment and when these gases are inhaled they damage our essential organs such as lungs, liver etc.

However, since the efficiency of management is a function of the relationship between the rates of generation and disposal, the number of person cannot determine

environmental quality. Also it depends on the quantity and quality of equipment at the disposal of solid waste disposal unit. The Kuje Area Council is unable to cope with the waste generated daily hence there is need for improving the existing poor situation in Kuje Area Council. It has also been observed that the management lacks accessibility for easy collection and disposal.

1.2 RESEARCH QUESTION

The following are the research questions which this project tried to answer.

Question 1: Does the study area have places for collection and disposal waste?

Question 2: How are the wastes collected and disposed of in the study area?

Question 3: What are the problems encountered during the collection and disposal of waste?

Question 4: What are the impacts of dumping waste on the environment?

Question 5: Does the study area have organization or agents responsible for the collection and disposal of waste?

1.3 STATEMENT OF ASSUMPTION

Having seen some of the problems associated with the area in study, the Area Council should encourage the proper collection and disposal waste by providing more collection and disposal units for waste.

In the area of study, waste collection and disposal is so carelessly done that they do not consider the health hazard involved. They have no equipment, vehicles to transport waste to dump them at a far distance, as a result, pollute the environment by producing unpleasant odour in the village which need proper care and monitoring by all

individual in the village to avoid outbreak of any disease caused by some flies that may settle on the waste and later feed on the food to be eaten by man.

The Federal government especially the management of Federal Environmental Protection Agency (FEPA) may have to send people of this at least every three months despite the sanitation day of every end of the last Saturday of the months. Because, some rural areas do not care so much about this last day of the month and to be able to present their periodic problems in the area, they have deficiency to the Federal Government. By so doing, there will be fewer problems of waste generation and disposal in our rural areas.

1.4 — PURPOSE AND SIGNIFICANCE OF STUDY

The purpose and importance of the study in waste collection and disposal in our environment is to appraise the existing condition of collection and controlled the disposal system of waste of Kuje Area Council, FCT, Abuja.

1.5 OBJECTIVES OF THE STUDY

1. To identify the problems associated with refuse in Kuje Local Government Area.
2. To suggest ways in which indiscriminate refuse disposal could be stored in Kuje Local Government.
3. To recommend ways by which wastes could be collected and disposed.
4. To suggest how to ensure that wastes in Kuje is properly maintained according to the rules governing the disposal of these wastes to avoid emission of odour in the environment.

1.6 SCOPE AND LIMITATION OF THE STUDY

The research was able to cover some selected areas of the study area. The study area is wide and some areas were not visited because of inaccessibility. These areas however are few and may not be a treat to the research project.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 DEFINITION OF WASTE

When the Environmentalist School of thought propounded the theories of environmental positivisms and probably as being superior concepts to environmental determinatism for explaining man-environment relationship little did they know that the “Conquest of the Environment” would lead to its destruction. Man in the recent past has been faced with a rapidly deteriorating environment that is mostly due to indiscriminate waste disposal attitude of the inhabitants. The deteriorating environment can also be as a result of deforestation, excessive gaming, marine pollution, atmospheric pollution, land-use and misuse which lead to gully erosion and flooding. Solid waste disposal problems, automobile and industrial and pollution among others are also problem of the environment.

The United Nations has embarked on a global awareness campaign through its GLOBAL ENVIRONMENTAL OUTLOOK 2000 (GEO 2000). In the developed countries of Europe and America, this awareness is high and it is the cause of several policies and strategies aimed at environmental preservation and conservation. The awareness campaign has been introduced to the developing countries. For instance, in Nigeria, the Federal Government has introduced various laws on the preservation of the environment. This can be seen through the establishment of commissions e.g. FEPA etc. Many non-governmental agencies (NGOs) have sprung up to discuss environmental degradation in Nigeria, and proffer solutions. The country’s Federal Environmental Protection Agency (FEPA) with its branches in all the States including Abuja, monitor

environmental quality. Very recently, the government established the Federal Ministry of the Environment to oversee the country's environmental problems.

Waste is any unavoidable material resulting from domestic activities or industrial operation for which there is no economic demand and which must be disposed off. Modern technology is extending stress on the environment, breaking some vital link in the web of physical and biotic potentials processes that maintain the ecological system in which man lives. The new technology that brings such high productivity and comfort also destroys man's biological capital such as air, water and other parts of ecosystem that must support him. They include the industrial waste, commercial waste and domestic waste. These pollutants constitute a nuisance into our environment causing discomfort and health hazard. They can be carried along far distance by air or by water, threatening the health, lifespan, recreations and personal hygiene.

Rivers, streams, ponds and lakes are polluted when waste products are discharged in them. Man's waste products have generally been hauled along with waste for disposal in open gullies, valleys, or abandoned pits. These disposal methods lead to more deterioration of the local environment around the dumping grounds. This is because some wastes attract different insects and vermin. The dumping ground also destroys the natural beauty of the environment around us.

2.2 AIM AND OBJECTIVE

The gathering and disposal of solid waste becomes a major public health issue of our time and this needs some urgent attention and management especially in our cities have become one of the most intractable environmental problems facing us today.

Therefore it is the aim of this project to examine the collection and disposal of waste generation and the technique of management.

2.3 SOURCES OF WASTS GENERATION

Waste is defined as the non-gaseous and non-liquid waste resulting from domestic activities of the inhabitants of a particular residential area (Adedibu, 1987). The phenomenon of waste generation is common to all human communities and often leads to urbanization process. In other words urbanization as a spatial process has its common constraints. For example, when population explodes, consumption tends to be elastic, and people create refuse from all sorts of materials used as packaging materials. Thus man's activities on domestic, commercial and industrial processes produce some undesirable effects, which are pollutants of all categories. According to Adedibu and Okekunle (1989), rapid population growth is a significant factor that is causing poor environmental sanitation. Nevertheless, there are other factors such as inadequate knowledge of the composition of solid waste, the rate to which population generates waste, inadequate and uncoordinated infrastructural facilities for waste disposal and rural-urban drift. Adedibu (1986) described the phenomenon of source of waste generation as a result of changes in wages earning by the workers. For instance, higher earning can lead to a great prosperity of buying specifically the packed items which can also increase waste generated by the high-income class.

Federal Environmental Protection Agency (FEPA) has categorized wastes into three main types as follow:-

- a. The municipal wastes arising from residential institutional, commercial and stress left over include pieces of paper, food wastes, plastic and rubber, pieces of metal, tins, cans, leaves and grasses among others.
- b. The industrial wastes such as cartons, boxes, crates and scrapes of building materials, wood and cellulosic materials, chemical wastes-oil and plastics.
- c. Toxic wastes. This category of waste is very harmful to health. For example, carbon monoxide emitted from the exhaustible fumes of cars, machinery, chimney, generating plants and other combustible items.

The sources of the waste generated increases as income rises but at smaller units (rate) than income (Adedibu, 1987). He opined that amounts of effluent discharge into the environment is related to the population composition, size and per capital income gives rise to the production and combustion of goods and services and that the discharge rate is increased. Lester (1987) says without population, there would be no pollution and that pollution is the price of progress. However, if qualification of amount of waste generated cannot be easily determined through a monocausal argument. In the sense of the world, Adedibu (1985,1986) observed that the amount of waste generated in every environment varies from individuals and from one to the other. But the absolute amount of waste generated per person has not been fully established.

The spatial variation of socio-economic and demographic characteristics as well as the level of technological development of an environment has been found to has influenced waste generation effort. For example, Adedibu (1985) noted that the economic activity of any community would determine to a great extent the quality and type of waste generated by the people. In an Agrarian economy for instance, the common types

of wastes are usually in the form of leaves, food remnants, harness wastes among others. But in industrial economy, tin cans, plastic packages among others are common.

Table 2.1: Sources of Waste Generation

Types of Wastes	General Composition	Generation Sources
Garbage	Waste from preparation of cooking, left over, market waste from storage and sales of wares	Household (kitchen), Restaurants, Stores and markets
Rubbish	Combustible papers, carbon unused papers, wood, rags	Office households market
Ashes	Residues from fire used in cooking	Kitchen, markets
Street trash	Leaf liters, corncobs, fruits peels	Restaurants, stores passed by food vendors
Abandoned vehicles	Unwanted cars, motorcycle and bicycle parts, wood logs	Roadside machines Lumbering activities

Source: America Public Works Departments (1968) from Akinjide (1998) – Current Issues in Nigeria Environment.

Mabogunje, (1974) further argued that the incidence of a population explosion in an area enlarge the size of household and thus translating into heavy waste generations. Generally, the source of waste generation is a function of many interaction variables.

2.4 WASTE DISPOSAL

The menace of solid waste disposal has been a very serious problem facing most urban centers in developing countries today. Rapid urbanization has in no small measure contributed to waste generation and sanitation problems in our cities. According to Berry

et al (1974), rapid urbanization along side the rising rates of industrialization have created great concentration of waste than the cities system can absorb. More wastes are generated in the third world countries than ever before (Adedibu, 1983). These wastes and their products are the cause of a great deal of environmental problems. Unfortunately, the methods of solid waste disposal are not well defined while management of the waste is grossly inadequate.

Greater attention however needs to be paid to the problems of waste disposal. This is because, about 5.2 million people including 4 million children die each year from diseases caused by improper disposal of sewage solid wastes. In developing countries, less than 10 percent of the urban wastes are treated. Only a small proportion of the treated waste meets the acceptable standards (Sanio, 1998).

In addition, the system of waste disposal pollutes water, air and soil resources. These exceed adequate steps being taken to manage and disposal of wastes more efficiently in the urban centers. It is estimated that by the year 2025, about 70 percent of the World's population will be urban and urban wastes will be more than quadruple (Sanio, 1998). This trend in waste generation should be a major source of concern to urban administrators stressing again the need for proper management of solid wastes in the urban centers.

The processes involved in the transformation of the solid waste in Kuje Area Council FCT, Abuja are basically as follows:-

1. Storage
2. Resources recovery/recycling
3. Collection and Transportation

4. Disposal
5. Organization and Farming

2.4.1 STORAGE

This type of storage of solid waste can be divided into separate and communal storage unit, with regard to Kuje Area Council both methods of storage are in use. Separate storage units are being standardized, non-standardized. The standardized container prepared to non-standardize.

In Kuje Area Council, it is found that various storage containers are in use. These are rectangular walled wasted bins, metal containers, cylindrical structure drums, big dish as cartons and an open space which often lead to big mountain of refuse at various points. These systems of waste disposal are inadequate and overflow onto the main/major roads. Most of the household cannot afford suitable containers, which result into burning of such refuse.

2.4.2 COMMUNAL STORAGE UNIT

This is the place whereby a number of household or compound depend in one storage unit. In Kuje Area Council there are almost 50 housing units. This result to the problem of insufficient use of the storage units, thus most of the households have developed the habit of indiscriminate dumping of solid waste. It has been observed that the storage units, which, were supposed to be full of waste, were in most cases empty due to the non-patronage of the storage unit provided by the Area Council.

2.4.3 COLLECTION AND TRANSPORTATION

Collection and transportation of refuse/waste materials differ from country to country, cities, towns and from one point of town to the other. In the study area (Kuje), collection and transportation of refuse is mostly carried out through the use of wheel barrow and other small containers and are deposited to the storage units which will later be collected and transferred by tippers hired by the Area Council for final disposal.

The collections of refuse/waste material in most developing countries are inadequate and ineffective. In the developed countries, however, waste management is very effective and adequate. Hence there is a stringent law about waste disposal and environmental protection.

2.4.4 WASTE DISPOSAL STRATEGIES

The disposal of waste is defined as the deposition of waste material that has negative to the society. This material is deposited far from settlements in order to prevent health hazard to the people and other living organism.

Open dumping system on land and water systems are the common method used in most of the developing countries such as Nigeria. Although this method is simple and cheap, it poses serious threat to the environment and public health.

Solid waste can be processed so that some of its components can be recovered for other useful material, an example of this recycling system. The only two realistic options for disposal are the oceans and on land. Generally, the former is presently forbidden by the Federal law and is becoming similarly illegal in most other parts of the country.

In the United States and tip in Great Britain, the dumps are the least experienced means of solid waste disposal. This was the original method of choice for almost all-

inland communities. The operation of a dump system is simple and involves nothing more than making sure that the truck empties out the waste at a proper spot/area. The problems of dump site are the emergence of odour, air pollution and insects at all the dumps which can cause serious health and aesthetic problems.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

The method of investigation in this project work will be through the use of prepared questionnaires, which will be distributed among the population of Kuje – the study area. All the responses received for the questionnaires will form the basis of the data. Apart from the question, the ground truth assessment of the study will add to the information required by the project work.

This information is collected by means of oral interview.

3.1 METHODS OF DATA COLLECTED

The main method of collecting the data for this research project is through oral interview, which was administered to the people in Kuje Area Council and its environs. Other methods of data collection for this project include the field observation and extract from various publications such as newspapers, library text and course notes. Information is also obtained from Environmental Monitoring Department of the Council. Sectional heads from various units were also interviewed.

3.2 SAMPLING PROCEDURES

The questionnaires were distributed to people living in Kuje and its environs using random sampling method. The scattered population were chosen because closer information needed to be received on the situation of waste management in majority of the study area.

The oral interview that was designed for collecting information from people living in the Area Council, Kuje can be seen below.

Oral interview for data collection for solid waste disposal

1. List the types of solid waste disposal system you practice in this area.

A

B

C

D

E

F

2. Are the waste disposal system practices in this area capable enough to keep this environment clean from being polluted?

3. List the methods of solid disposal management

A

B

C

D

E

F

4. What is the importance of solid waste management in the environment?

A

B

C

D

E

F

5. To what extent did government interfere in solving the problem of pollution due to waste in this area.

3.3 DATA ANALYSIS

The data collected were analyzed through the use of percentages and tested. The data from the questionnaires were tabulated. These data were then used for various discussion of the result.

CHAPTER FOUR

4.0 DISCUSSION OF RESULT

A total of 120 questionnaires were sent out to respondents and 94 completed questionnaires were returned, representing 78% of the total number of questionnaires sent out. The responses are as follows:

Question 1: Which of the following drainage system are more nearer to your house?

Table 4.1

Frequency	Percentage
19	20.2%
20	21.3%
30	32%

Of all the waste generated in the study areas, polythene bags constituted the largest. These polythene bags were mostly waste from pure water, Sobo drinks and other commodities sold in polythene bags. Polythene bags constitute about 32% of the total wastes generated. This is followed by food particles of different categories like oranges, cassava, yam, mango etc.

Question 2: How do you handle household waste?

Table 4.2:

Responses	Frequency	Percentage
By throwing them any where	64	68.1%
By storing them in dustbins	10	10.6%

Wastes generated from the study area are largely thrown away into nearly drainage system instead of being stored before removal. About 68.1% of the total wastes generated are simply thrown away. This also indicates that the use of dustbins is not in practice. Only 10.6% of the respondents store their wastes before they are collected for disposal. These are mostly the enlightened people that occupy bungalows or flats with modern system of waste disposal.

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

Table 4.3:

Responses	Frequency	Percentage
Immediately wastes are dumped	11	11.7%
Not removed at all	10	10.6%
Removed after several weeks	63	67%

Table 3 above indicates that the bulk of the wastes dumped at the various dumping sites within the study area are abandoned for several weeks without removal. 67% respondents indicated that wastes are abandoned at the dumping sites local channel for a long time before removal. This indicates that the waste sometimes block effective passage of water. This could cause flooding of water that could lead to damage of properties.

Question 4: When do you observe wastes increases in Kuje

Table 4.4:

Responses	Frequency	Percentage
Rainy season	57	60.6%
Dry season	17	18.1%

Of the whole wastes generated within the study area, 60.6% is in the rainy season. This may be due to the additional agricultural wastes that are abundant during the period. There is only about 18.1% increase in waste generation during the dry season.

Question 5: People do not use dustbin but prefer local drainage due to:

Table 4.5:

Responses	Frequency	Percentage
Poverty	27	28.7%
Ignorance	14	14.8%
Not provided by government	33	35.1%

Majorities of people in the study area constituting 35.1% of the respondents have indicated that people do not use dustbin but prefer to dump their wastes into local drainage because the government does not provide them. This is followed by 28.7% of the respondents who attributed the lack of usage of dustbin to be due to poverty. The remaining 14.8% of the respondents attributes the reason to ignorance. It implies that they are not aware of danger that can be caused through the blockage of these drainage systems.

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

Table 4.6:

Responses	Frequency	Percentage
Throwing the wastes everywhere	25	26.6%
Storing in dustbins	49	52.1%

About 52.1% of the respondents have shown that the government should employ labour (direct involvement of government) of dustbin is the best way to help in management. About 26.6% of the respondents however indicate that throwing the wastes away is the best way to deal with the solid wastes. This indicates that majority of people will be provided by the government.

Question 7: How can the government improve waste and local channel/drainage management

Table 4.7:

Responses	Frequency	Percentage
Early removal of wastes from channel/drainage system/ environment	62	65.9%
Increasing public awareness	12	12.8%

Source: Compiled by the author

Table 7 above indicates that about 65.9% of the respondents in the study areas have indicated that the government can improve the waste and local channel/drainage management by quick removal of solid wastes from the dumping sites. This has also shown the level of disturbance heaps of refuse in and around the environment constitute to the people in the study areas. The 12.8% response means that people do not see public

awareness as important as immediate removal of wastes from within and around the environment.

Questions 8: Which is the best way to dispose off solid waste?

Table 4.8:

Responses	Frequency	Percentage
The use of channel/drainage	00	0.0%
Dumping into the bush	41	10.6%
Dumping within the town	23	24.5%

Source: Compiled by the author

About 43% of the respondents in Table 4.8 above have indicated that dumping the solid wastes inside the bush is the best 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. About 24% of the respondents have shown that dumping within town is still the way to improve solid waste while the remaining 10.6% of the respondents are in support of burning the wastes. It is to be noted that non of the respondents are in support of burning the wastes. It is to be noted that non of the respondents are in support of dumping waste in drainage channels, this implies that majority are aware of the danger of erosion and flood.

Question 9: Which of the following hazards is more disturbing if drainage channels are blocked with solid wastes?

Table 4.9:

Responses	Frequency	Percentage
Damage of properties	13	13.8%
Offensive smell	25	26.5%
Flooding of the environment	36	38.2%

Source: Compiled by the author

In Table 4.9, 38.2% of the respondents believed that flooding of the environment is more injurious; this could lead to inaccessible road and make movement very difficult. This is because every household near the flooded channel is uncomfortable due to the muddy and wet ground. 26.5% of the respondents are of the view that offensive smell from the dumping sites are more disturbing while waste are mixed with flooded water. Only 13.8% of the respondents have pointed to damage of properties to be the most disturbing hazard of channel blockage.

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

Table 4.10:

Responses	Frequency	Percentage
Reduced visibility	12	12.7%
Breathing difficulty	14	14.8%
Eye irritation	48	51%

Source: Compiled by the author

The largest number of respondents constituting 51% sees eye irritation to be most disturbing effects of smoke nuisance from dumping sites. Breath difficulty comes next

with 14.8% of the respondents in support while reduced visibility comes last as the number of disturbing effect of smoke nuisance as supported by 12.7% of the respondents.

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

Table 4.11:

Responses	Frequency	Percentage
Solid wastes falling into drainage from dumping sites	09	09.6%
Wind blowing wastes into drainage	19	20.2%
People directly dumping wastes into drainage	46	48.9%

Source: Compiled by the author

48.9% of the respondents in Table 11 believed that drainage in Abuja are blocked by refuse directly thrown into them by the people while 20.2% believed that the wastes in drainage are blown in by the agent of wind. Only 09.6% of respondents see the blockage to be due to direct falling of wastes into the drainage from dumping sites thereby resulting in blockage.

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

Table 4.12:

Responses	Frequency	Percentage
Offensive smell	24	25.5%
Flooding of surrounding areas	49	52.1%

Source: Compiled by the author

Out of 94 respondents in Table 12, 49 people representing 52.1% consider the effect of the blockage to drainage to be flooding of the surrounding areas while the

remaining 24 people representing 25.7% see offensive smell to be what is likely to happen due to drainage blockage.

4.1 GROUND ASSESSMENT

On the ground assessment, the study indicates that the whole environment had scattered presence of one type of solid waste or the other. There were however limited quantity of waste in the street due to hard work of Federal Capital Urban Development Board who are always seen sweeping the streets, particularly the main street that runs through Kuje.

The solid wastes dumping sites are located in some strategic locations in Kuje and its environment. Most of the dumping sites have grown into heaps of solid wastes and are very close to drainage channels. The height of the wastes kept on growing because of non-collection of wastes as soon as they are dumped. It is possible to have some parts of the wastes that have been dumped for several weeks without collection.

The composition of the wastes is largely polythene bags. Some have been dumped for several months while some are freshly dumped. Apart from the polythene bags raw and cooked food wastes were also noticed in large quantities. There were also little scattered presence of metal and rubber wastes around the dumping sites.

Most of the channels/drainage systems visited were in a terrible state of offensive smell emanating from the rotten garbage and other rotten materials. This is as a result of the mixture between wastewater and rotten garbage. The solids wastes from all the dumping sites that are close to drainage channels are threatening to or have completely blocked the drainage of runoff from rainwater across the channels. Where the dumping

sites are close enough to drainage systems the wastes are seen falling inside the drainage system.

Some wastes are also set on fire because of irregular collection. The fire produces huge smoke nuisance that spread over a wide area surrounding the dumping site. Animals like goats, chicken, dogs etc. are seen mouth-probing into the wastes looking for some food. These animals contribute in scattering the wastes all over the dumping sites. Looking along the modern drainage system in Kuje, there are areas that are blocked by the solid wastes.

4.1.1 Erosion:- While flooding is a seasonal problem, erosion produces a rather permanent problem in some locations of Abuja especially Kuje, Plateau, Gombe etc. Erosion is so severe that the roadways have been worn away and reduced making movement of vehicles difficult. In some areas of Kuje (FCT) and Enugu, even natural drainage receiving runoff from the urban areas show signs of both erosion and sedimentation. Another aspect of urban erosional problem is the erosion pavements of houses and the foundations. This has led to the collapse of fences, some measures to control erosion by urban residents includes dumping of huge sacks of sand in erosion areas and gully heads. Another method is making of basket like structures to aid deposition of sands (George, 1941).

4.1.2 Health Related Hazards:- Environmental degradation may also result from poor storm water management in the urban centers. It is a known fact that many areas that are not well drained serves as suitable ground for breeding of diseases carrying pathogens. Some of the present drainage channels are a maniac to public health and welfare (Jackson et al, 1966). The act apart from polluting the air, contribute in the spread of various water

borne diseases such as typhoid, gastroenteritis, amebiasis, arsenic poisoning; such fouled water can gain passage to public tap through broken water pipes in drains. Where clearing of drainage channels are attempted, no provision is made for the disposal of the solid waste from the cleared area. The wastes removed from the drainage channel are piled up by roadsides, which eventually end up again in the same channel. The stagnation of water and the decomposition of debris result in the production of highly undesirable and offensive odour, which can be hazardous to the health of the populace.

Planning of urban drainage channels is an important aspect of planning of an urban area like Kuje, because of its attendant consequences. In Nigeria, flooding and erosion are the two major drainage problems that are rampant after heavy rainfall. Many roads, residential and non-residential compounds or open spaces are usually flooded. It does not only block roads, but also damage houses and properties worth million of Naira. Huge quantities of sands are normally deposited on roads' causing damage to the asphalt used in road construction, which usually weakens and disintegrates the road when subjected to prolonged period of floodwater. Drainage has been one of the pressing problems in urban areas. In urbanized environments, the infiltration capacity of the ground is further reduced by the replacement of vegetal ground cover with a lot of impervious surfaces. According to Leopold (1986) of all the land use changes affecting the hydrology of an area, urbanization is by far the most hazardous.

Urban drainage problem is a phenomenon, which has got the attention of many environmentalists and government. As Lazarus (1978) said, it is generally accepted that the trend towards more intensive urbanization existed in the United States and in nearly all other nations will continue through the remaining parts of the countries. The

hydrology of urban areas is quite complex. This is evident in our urban centers where problems are on increase with increasing urbanization. The demand for better a study of the growing magnitude of urban drainage problems and the inability of traditional method of dealing with the problems need to increase.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 SUMMARY

The outcome of the data analysis and the general assessment of the study area have shown that the most common drainage system is the local ones which are mostly constructed by the various landlords. This construction terminates at the end of their house/building. The fact that industrial growth is still low within the study area, industrial wastes is not yet a disturbing phenomenon. It is however disturbing those dustbins are not in use 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 this have minimize the blockage of channels. Apart from the reason given in (Table 5) 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. Thus they resulted in dumping their wastes in local channels/drainage system.

The dumping sites within the study area were hygienically in a miserable state. In fact, the dumping sites are eyesores. Wastes are continuously dumped but are not regularly collected. It is even difficult for people who come to dump their refuse to reach the central point dumping so that refuse is deposited anywhere near the dumping site. In most cases, however, wastes are dumps in channels so that the fence of the water/rain can carry the waste elsewhere. When the rain stops the dumped wastes are left in the bed of the channel and eventually the wastes will block the channel, which result into flood.

Apart from the unsightly nature of these dumping sites there is also the problem of offensive smell from the rotten materials concealed in the heaps of wastes. The smell even increases during intensive heat when decomposition rate heightens. The smell makes life seriously uncomfortable for the inhabitants of the areas with dumping sites. Furthermore, domestic wastewater and rainwater causes offensive smell when they mix with rotten solid waste.

Most pedestrian paths close to the dumping sites are completely blocked. People who normally should pass through the blocked road path are forced to take alternative route. The drainage systems close to the sites are also threatened with blockage. There are areas along the large drainage systems in Kuje where solid wastes have accumulated to extent that some parts have started blocking. The closeness of some dumping sites to the drainage system may result in some wastes falling inside the drainage system but people also throw wastes directly (Table 4.1) into the drainage system.

There is clearly no presence of legislation that checks the activities and conducts of people towards the environmental protection. What the community uses as environmental sanitation laws are a set of laws that are decades old and can no longer stand the test of time and circumstances. The public health edict in existence is a product of Military Government of 1984. The edict is inadequate to be able to address the present environmental complexities and its punitive provisions are watery. Human beings no matter how mindful about environmental purity should have set of laws by their side as a reminder.

5.2 CONCLUSION

It clearly appears that the Area Council and Federal Capital Development Authority have not done enough in terms of the provision of effective and adequate manpower and equipment to deal with the issue of solid waste and poor drainage channel system management. The people on their own part appear to be either ignorant of or socially disable to provide dustbins for use. This turns every available space of land a potential dumping site.

Finally, the absence of effective and comprehensive legislation against acts that promote environmental degradation is a contributive factor in the filthy state of the environment in Nyanya.

5.3 RECOMMENDATIONS

The non-existence of dumping sites in the study area is not acceptable and should be stopped. All the wastes collected should be taken to the bush far away from the town and dumped. This becomes necessary as an interim measure because there is local technology that will reduce the wastes into some useful materials and all the other methods of disposal earlier discussed will not be able to cope with the volumes of refuse generated. The wastes, after a long time can be used as manure. As for the polythene bags, it is impossible to stop their usage and they do not decay like other types of wastes. In the absence of a technology that will reprocess them, they have to be taken outside the town like other types of solid wastes.

For the above recommendation to be reasonable, there should be the provision of dustbins of smaller sizes for households to store all the refuse generated. A better and well-protected channel should be constructed. A bigger size dustbin should be provided

at particular locations to serve a number of households. This should be accompanied by the provision of adequate and effective manpower and equipment that will collect the wastes from various points at regular intervals.

Finally, a set of legislation should be promulgated to check the activities and conducts of the people towards maintaining a clean environment. The legislations should be strong enough to deal with anyone, no matter his social position, who contravenes any of the environmental protection law.

REFERENCES

- Ademiluyi, A. (1998). Waste Management in the petroleum industry. Seminar presentation held at PortHarcourt.
- Awaisu et al (1997). Urban Field Seminar. B.U.R.P., Ahmadu Bello University, Zaria.
- Ashiru, R.O. (1999). Collection and Transportation of Refuse. Lecture delivered at the National Waste Management course held at The World Health Organization Training Centre, Yaba, Lagos.
- Davey and Light Body (1971). Control of disease in the Tropics. The English Language Book Society & H.K. Lewis and Company Limited, pp 210.
- Lucas, A.C. & Gilles, H.M. (1981). A short text book of preventive medicine for the Tropics. Hodder and Stoughten, pp 272.
- Olubori, J.O. (1999). Solid Wastes Recycling and Disposal options. Lecture delivered at the World Health Organization Training Centre organized by Federal Ministry of Health Environmental and Occupational Health Division.
- Oluwande, P.A. (1983). A guide to tropical environmental health and engineering. Nigerian Institute of social and Economic Research (NISER), Ibadan, pp 150.
- Umar, I.E. (1999). Solid Waste Management problems in Northern Nigeria. The Pointer Magazine, Vol. 11, pp 7.