

**ENVIRONMENTAL MANAGEMENT
STRATEGIES AND THEIR
EFFECTIVENESS IN SOLVING
ENVIRONMENTAL PROBLEMS IN
ABUJA**

(A CASE STUDY OF KUJE AREA COUNCIL)

BY

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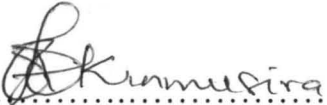
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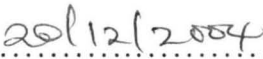
DECLARATION

I hereby declare that this project was carried out by me, under the close supervision of Dr. P.S. Akinyeye. And it has not been submitted anywhere else for the award of the postgraduate diploma. All published works of authors have been fully acknowledged.


.....

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Date

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To the repository of knowledge,
fountain and father of grace, I say

“EPAINOS”

2.2.4 Topography

2.2.5 Land use

2.2.6 Vegetation

2.2.7 Population

Chapter Three ----- 18 -44

3.0 Literature review

3.1 Introduction

3.2 Attitude of people

3.3 Definition of special terms

3.4 Important sewage disposal

3.5 Methods of sewage disposal

3.6 Waste water management

3.7 Performance criteria for waste water management

3.8 Establishment and function of AEPB

3.9 Urban environmental management problems in Nigeria

3.10 Tackling environmental problems

Chapter Four ----- 45 - 55

4.1 Data collection

4.2 Data analysis

Chapter Five ----- 56-60

5.1 Discussion of result

5.2 Management of waste

Chapter Six ----- 61-66

6.0 Conclusion and recommendation

6.1 Summary of finding

6.2 Proposal and recommendation

6.3 Conclusion

References ----- 67-68

Appendix ----- 69-70

CHAPTER ONE

INTRODUCTION

Abuja is the Federal Capital Territory (F. C. T). It is referred to as the capital of Nigeria. Just like Lagos, the population is increasing and care must be taken especially in the area of environmental issues concerning management, which is the utmost importance for the continuity of life. The Federal Capital Territory is divided into 6 (six)-area councils. They are AMAC- Abuja Municipal Area Council, Abaji area council, Gwagwalada, Bwari, Kwali and Kuje area council, which is the study area.

The environment is one of the essential issues of global concern today. The environment encompasses the land, water, air, nature and its habitat, the ecosystem and all the factors, which make up living surrounding. It comprises both man made and natural elements of the earth surface. It is frequently prone to both natural and artificial pressures, which result in negative effects and subsequently, aggravated in environmental problems in most of the urban centers today. Against this background, physical planners all

over the world have always taken it up as a professional challenge to solve urban environmental areas from imminent collapse. In recent times, Kuje, been one of the satellite towns in Abuja city, has been experiencing series of environmental problems that require urgent attention.

Unfortunately, little has been done to solve these problems. Hence, the strategies involved in environmental management of the study area.

However, environmental problems in Abuja include the following:

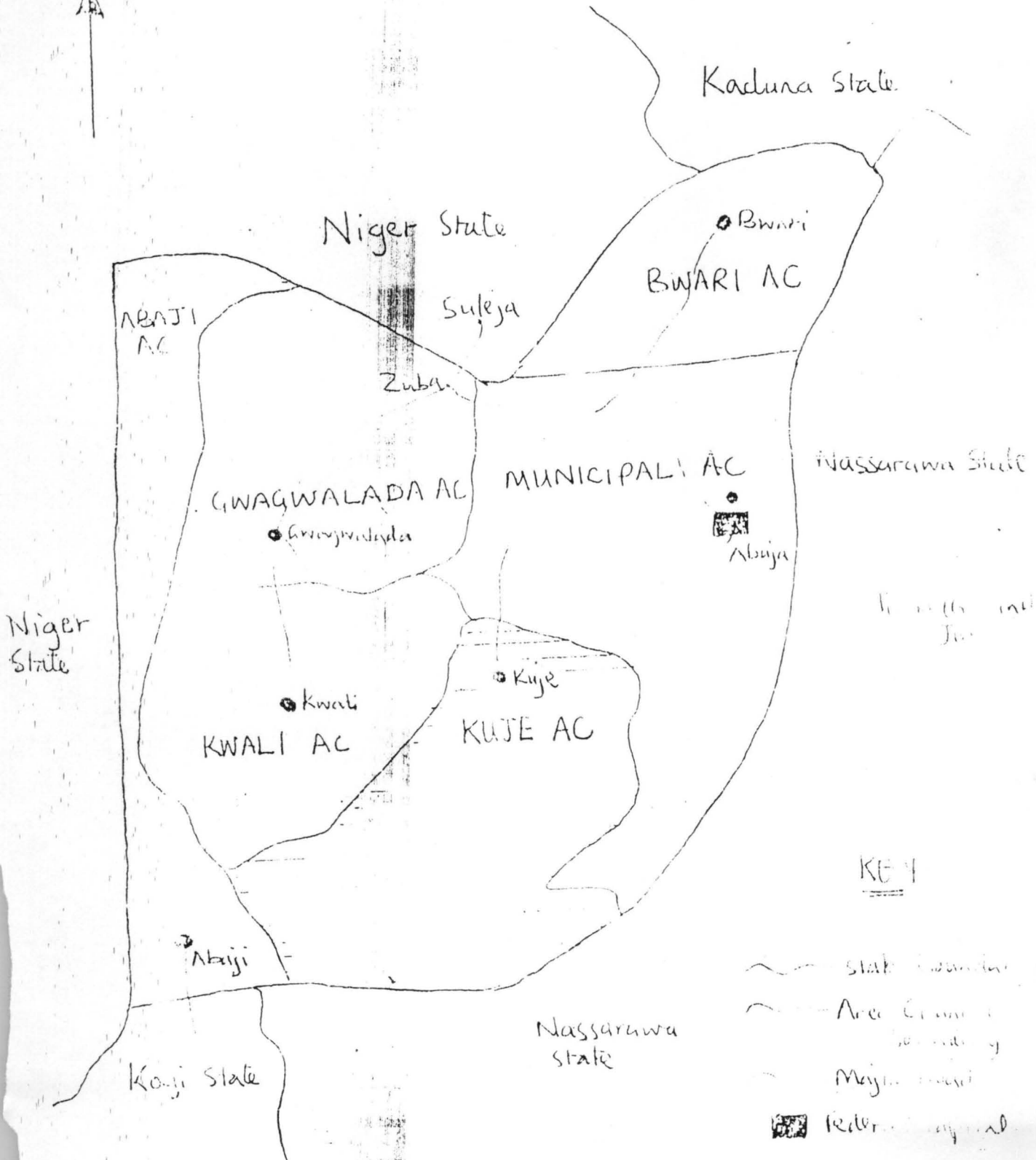
- (a) Deforestation and Desertification
- (b) Soil erosion
- (c) Solid waste disposal
- (d) Water and Air pollution
- (e) Industrial effluents (minimal)
- (f) Chemical in the environment
- (g) Pollution from municipal and hazardous waste.

- (h) Sewage disposal
- (i) Population growth
- (j) Distribution of available resource such as land e.t.c.

111

FEDERAL CAPITAL TERRITORY (FCT)

SHOWING 6 AREA COUNCILS



KEY

- state boundary
- - - Area Council boundary
- Major road
- ☐ Federal Capital

As part of the current efforts to save the urban centers from environmental decadence, the study critically examines the nature and the various factors that constituted environmental problems in the study area with a view to making proposal to enhance a better environmental quality in the F. C. T. - Federal Capital Territory. To this end, therefore Kuje Area Council has become a focus of this study to ensure environmental development in Abuja and other parts of the country.

1.1 STATEMENT OF PROBLEMS

Environmental problems concern the quality of our society (surroundings) - Terrestrial, aquatic and atmospheric. Unfortunately, these problems are often difficult to analyze in cost benefit terms. The major benefit and many costs have no natural monetary values. Examples are protection of public health, preservation of natural areas and wildlife, improvement in air quality, reduction in urban noise levels. The net result is that every decision involving the environment entails an explicit judgement about how much we ought to be spending on the goals that it is designed to achieve.

Humanity and other species have a common long - term interest in conservation. The deterioration of the environment affects work opportunities and the qualities of life in rural as well as urban areas and seriously contribute to poverty and ill health. Depletion or deterioration of resources, means an increase in the economic costs of growth, because the loss in the natural productivity of resource has to be off set by energy and technology subsidies; meanwhile, ad - hoc remedies must be found for the negative effects of environmental deterioration in health and living standards.

All these can be summarized as follows:

- (i) The rate at which developmental problem occurs in our urban centers today is quite alarming.
- (ii) Poor environmental management
- (iii) Uncoordinated informal economic activities.

1.2 AIMS AND OBJECTIVES

The aim of the study is to be able to recognize the basic environmental problems in Kuje, Federal Capital Territory (Abuja) and

the strategies employed in combating the hazards with a view to making recommendations and proposals to improve the environmental quality in the study area. The specific objectives are:

- (1) To analyze the rate of effectiveness of management strategies.
- (2) To suggest ways of preventing harmful effects on human and other activities on the environment.
- (3) To preserve the nation's ecological setting and ensure the protection of the health and well being of the people.
- (4) To ensure balanced exploitation of all energy resources and with due regard to environmental protection.

1.3 JUSTIFICATION

The study will be relevant to Abuja Environmental Protection Board (A. E. P. B.), Federal Ministry of Environment, NGOs - Non-governmental Organizations, Area Councils, Community Based Organizations, (C.B.O) and other environmental protection organizations within

and outside the territory as well as the community at large.

1.4 SCOPE AND LIMITATION

The scope of the study covers Kuje town with particular reference to management strategies and their effectiveness in solving environmental problems in Kuje Area Council.

CHAPTER TWO

1 LOCATION OF THE STUDY AREA

What are referred to as Local Governments in states are designated Area Councils in Abuja, the Federal Capital Territory (F. C. T.). There are six area councils in the F. C. T, namely: Kuje, Abaji, Gwagwalada, Municipal, Kwali and Bwari.

Kuje Area Council is made up of the former Kuje and Rubochi Development Area, which were merged together in November 1987. Before the creation of the F. C. T, Kuje Development Area was a district in Suleja Local Government of Niger State while Rubochi Development Area was a part of Gadabuke District in Nassarawa Local Government of Plateau State.

It shares a common boundary with Gwagwalada, Kwali and Abaji area councils to the West, Municipal area council to the North, Nassarawa State to the South. Kuje Area Council is predominantly rural in setting and has far and hard to reach districts, such as Rubochi, Gudun, Karya and Kabi. Some of the feature terrain affecting mobility is hilly and mountainous areas, rocky, deep gully

riverine and sandy areas.

However, with the constitutional changes carried out in 1985 and approved by the Armed Forces Ruling Council (A. F. R. C.), the designation of local government area was changed to area council with Kuje as the headquarters. A chairman elected in March 1997 along with other various Local Governments in the country is administering the area council. Like all other local governments, Kuje area council comprises the honorable Chairman; four Supervisory Councilors assigned a department each for full supervision of its entire staff, activities and operations.

GEOGRAPHICAL LOCATION

Kuje Area Council which covers a total land area of 1,800 square kilometres or nearly 22.5% of the Federal Capital Territory is bounded by Gwagwalada Area Council to the West, Municipal Area Council to the South West. The area council is known for its beautiful and picturesque scenarios that are the joy of tourists. The scenarios around Rubochi, Kujekwa, Pegyi, Kasada, Kabia, Agwai, among others are marvellous to behold. The entire area council has one of the most fertile lands in the country and has a population of well over 250,000 people who are mostly Gbagyi, Gade, Bassa, Igbira-koto,

Hausa/Fulani and other ethnic groups that have moved into the area council from all parts of the Federation.

2.2 CLIMATE OF THE STUDY AREA

A comfortable living environment will depend on maximising the aspects of the environment, which reduces heat and effect of humidity, and protects from rain and dust. Although, a detailed climatic information is not yet available, extrapolations from existing airport meteorological stations have been used to develop the basic description of the climatic parameters presented here.

2.2.1 RAINFALL

The beginning of the rainy season in the north-eastern F. C. T., which is part of the study area (Kuje Area Council), is around April 10. The rain takes off very rapidly after 20th of October. Thus, the duration of the rainy season is between 180 days to 190 days. Consequently, the amount of rainfall is usually 60 percent annually which is in the month of July, August and September. This concentration of rainfall shows the need for drainage system that can handle large volume of water very quickly.

2.2.2 TEMPERATURE

Temperature-Humidity: In human terms, net radiation is felt as air temperature, the response to which is greatly influenced by the humidity conditions in the air. The F. C. T. records its highest temperature during the dry season when there are few if any clouds. Changes in temperature of as much as 17⁰c have been recorded between the highest and lowest temperature in single day. During the rainy season, the maximum temperature is lower due to the dense cloud cover. Diurnal annual range is also much lower, sometimes no more than 7⁰c in July and August. Generally, in the F. C. T, relative humidity falls in the afternoon to as low as 20% in the city zone. In the rainy season, the relative humidity is much higher, especially in the morning hour when it can reach as high as 95%.

2.2.3 TOPOGRAPHY

The study area is typified generally by gently undulating terrain interlaced by riverine depression. Generally, the high variation from the west of hill to watercourse varies around 80 meters or less. The study area consists of upland and plain with Nemours Insolbergs, whole backs and back other rocks outcrops of various sizes. Within

the 1200-foot crescent, the linear path of these outcropping to parallel backs of resident sector or either side, learning the more broken land scapping.

2.2.4 WIND

In June, the northerly flow of air component has weakened and only the southerly flow predominates. Being moisture-laden, it brings a lot of rain. In September, the tropical continental begins to intensify over the territory and the north east trade becomes dominant wind from October to March bringing with it dry, cloudiness but dust-laden conditions associated with harmattan.

2.3 LAND USE

As the food basket of the Federal Capital Territory. Agriculture is the main occupation of the communities of the Area Council. According to the current statistics of the F. C. T. Agricultural Extension Service Division of the Department of Agriculture, Kuje Area Council provides over 30% of the food grown in the F. C. T. This therefore qualifies the area council

Food production is receiving tremendous boost because of the great market and commercial potentials of the Area Council. Crops

grown in the Area Council include yam, Soya-beans, cassava, sugar cane, guinea-corn, maize, bean seed, rice and millet. The area council is currently the greatest producer of yam, which is not only marketed to other area councils but the neighboring states and beyond. The farming activities and the high income derived from the sale of produce in the area council has helped in enhancing the standard of living of the rural populace and the development of commercial centers in Kuje, Rubochi, Kwaku, Gudi-Karya and a host of other places.

The management of the area council has been promoting the development of Agriculture at the grassroots through regular provision of inputs like fertilizer, improved seedlings, herbicides, insecticides and tractors at subsidized rates, in addition to extension services. The area council has also been encouraging the development of small-scale industrial enterprises by creating the necessary conducive atmosphere. Typical of these are the several garri-processing industries as well as the rice mill and groundnut-processing industry respectively located at Kuje and Kulo.

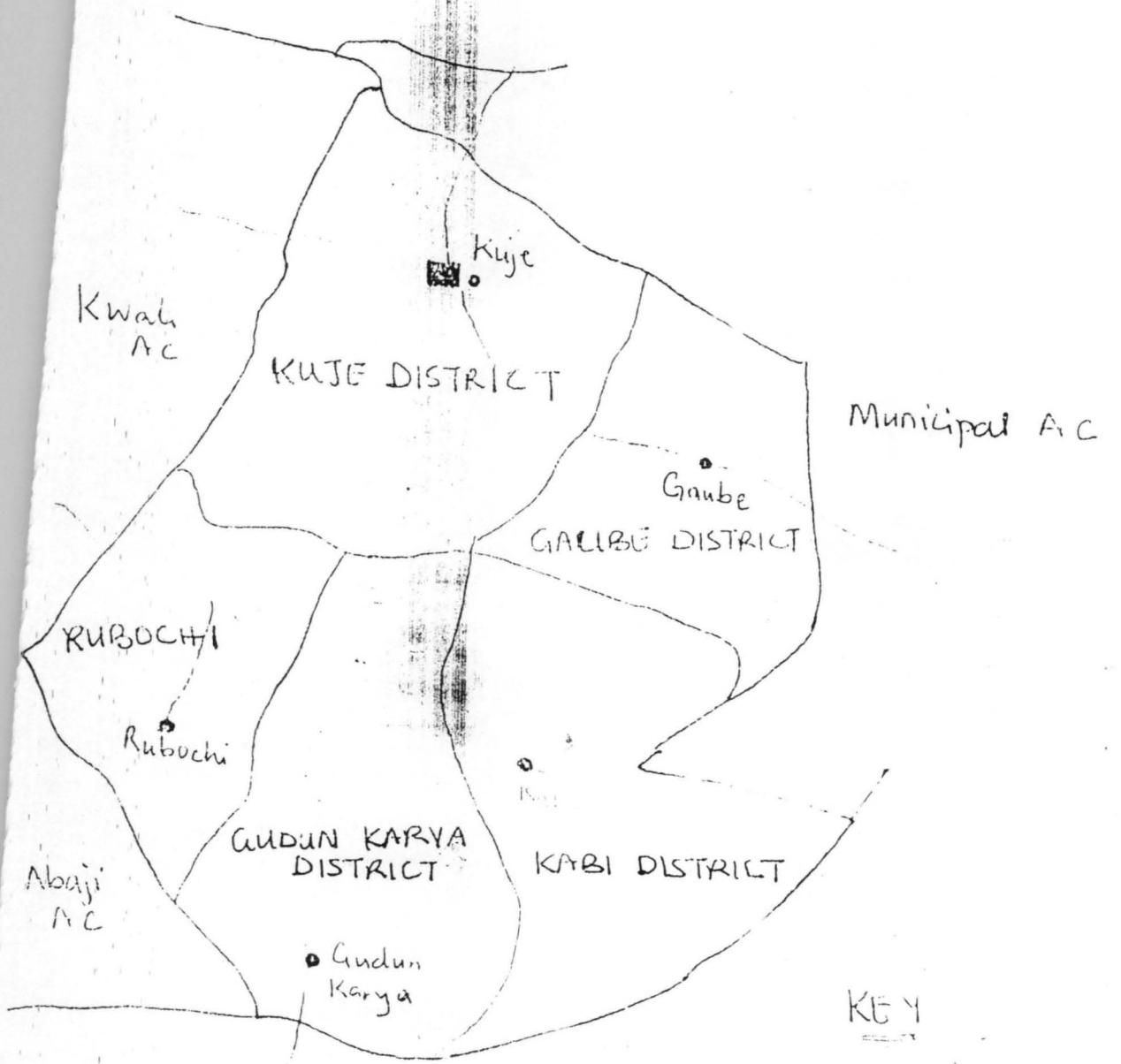
Kuje Area Council has taken a giant stride in the area of education. The area council has invested a lot of money to rehabilitate a number of schools in order to improve the quality of education in the area. Presently, the area council has about 67 primary schools with a total intake of pupils numbering over 9000. Source (K. A. C.) - Kuje Area Council Headquarters -Kuje Abuja). The structures do not pose any environmental problems in the study area. This is because they are properly and legally planned.

2.3.3 ROAD NETWORK

From the study area (Kuje Area Council), the following zones can be linked, which are Kuje, Yenche, Ganbe, Kuje-Kwa, Gwagwalada, Gudunkarya, Chibiri, Kwaku, Kabi and Rubochi. Hence, it can be stated that the road network based on the above fact is unique, therefore linking other areas such as Lugbe, airport road, Gwagwalada and Kwali Area Councils. The road network will not pose any serious environmental problem because they are properly designed.

1.2 KUJE AREA COUNCIL OF FCT

SHOWING THE FIVE HEALTH DISTRICTS



KEY

- Area boundary (solid line)
- District boundary (dashed line)
- Area Council boundary (dotted line)
- Area Council HQ (shaded square)
- District HQ (dot)

2.4 POPULATION

Population term referring to the total human inhabitants of a specified area, such as a city, country or continent, at a given time. It is connected or concerned with the size, composition, and distribution of population, their pattern of change overtime through births, deaths, and migration; and determinants and consequence of such changes.

Kuje Area Council based on the fact that is one of the closest areas to Abuja Municipal Area Council is well populated as a result of inflow of people into the area from neighboring people.

However, there are five health Districts and ten wards in Kuje Area Council. The five Health Districts are Kuje, Gaube, Rubochi, Kabi and Gudun Karya. It has an estimated population of 111,960 and target population of less than 5 years of 22,392. There are 36 Government owned facilities and privately owned ones in the area council. The major ethnic groups are Gade, Gbayi and Bassa and their occupation is farming.

Kuje town already has a number of important establishments some of which include: A medium security prison, F. C. T Prison Command Headquarters, National Population Commission, Peoples'

Bank, N. A. C. B collection Center, National Electoral Commission of Nigeria, National Orientation Agency, Immigration Service Unit, the Federal Civil Aviation Authority Quarters and N A L D A F. C. T Headquarters.

Therefore, due to population increase, the resource available in Kuje and its environs will not be evenly distributed in the proper manner, which may lead to various adverse effects on the environment and the people in the area as well. Hence, there should be a means by which population growth must be curbed before it results in an unwanted situation.

Some of the problems of over population, which may hinder management strategies, are:

- (i) Lack of adequate Infrastructure facilities.
- (ii) Lack of good comfortable accommodation.
- (iii) Shortage of food supplies.
- (iv) Apart from food shortage, demand will be higher than supply.
- (v) Over cultivation of land in order to get more food leading to environmental degradation.

- (vi) Heaps of refuse disposals would be found all over the place and this results in environmental pollution.
- (vii) Health care service will be low - due to population explosion.
- (viii) Environmental Protection Agencies available would definitely have more work to do, than the required service to be rendered.
- (ix) If care were not taken, there would be competition in several aspects, leading to unconducive environment.
- (x) Hence, the rate of development would definitely be minimal despite all available resources in the area.

2.5 VEGETATION

The vegetation of the study area is generally characterized by park Savannah. Riverine depressions are typically skinted by fringes of thickness and high tree. There are occasional patches of forest heavily wooded area. However, shrub Savannah vegetation occurs on flatter plains and undulating terrain. It is comprised primarily of shrub vegetation, with a well-developed grass layers and a few scattered emergent trees. Human use and fire play an important role

in the removal of cover. Hence, due to the farming exercise carried out in the study area, (Kuje area council) - it is referred to as the "food basket of F. C. T." and as a result, there is a vast vegetation cover in most places enhancing the preservation of resources.

The implication of vegetation removal on the environment that necessitates solution can be stated as follows:

- (i) Because of climate change, there would be series of effect on the environment, especially when there is no cover.
- (i) Flooding - This will be more rampant and lack of vegetation can quickly enhance its effect on the environment.
- (ii) Erosion - If there is nothing to support or reduce the effect of erosion in the environment, such as the vegetation, definitely, the adverse effect of erosion would generate into gully erosion. that is from Rill, to Sheet and to Gully erosion.
- (iii) Vegetation supplies oxygen to the environment, enhancing the continuity of the ecosystem.
- (iv) Also, vegetation beautifies the environment and if it is not available, it opens the environment to series of attacks.

CHAPTER THREE

LITERATURE REVIEW

3.1 INTRODUCTION

Environment is a combination of all living and non living elements in our environment; elements made by human beings, there are inter relationships between these and various circumstances which surrounds people on earth. In addition, most countries of the world are seriously concerned with the problems of environment, pollution of air, water and land.

These environmental problems are greatest in the industrially developed countries and in areas with high population densities, Nigeria is a practical example (Lester, 1999) stated that without population, there would be no pollution and pollution is the price of progress.

Therefore, it is clear that continued progress is dependent on pollution abatement in particular and environmental protection in general. Wastes generation and environmental degradation has been associated with human settlements since the dawn of history. It has also been observed that amount, size and nature complexity of pollution generate by human are profoundly influenced by the level of urbanization and the intensity of socio-economic development of the settlements.

The problems of refuse disposal, collection and environmental sanitation in our cities and urban areas through the country have

occupied the attention of both Federal Government, state and Local Government Authorities for many years. Public concern on these issues continue to be expressed daily through the media, in newspapers, radio and television.

3.2 ATTITUDE OF PEOPLE

Attitude is the predisposition to respond in a certain way in a Situation, event or idea. The response may come without any reflection. A person who shows a certain attitude towards something is reacting to his conception of that thing rather than to its actual state. An attitude is more enduring than a mood and it produces a consistent response. For example, a man has an unfriendly attitude towards foreigners will show dislike for most foreigners he meets or hear about.

Attitude is closely related to opinion. A distinction can be made, however, each person can state his opinion or words but may not be able to express his attitude in the same way. He will reveal his attitudes by his actions and only indirectly by the content of statements. Attitudes are unfavorable though a favorable prejudice is a rigidly fixed attitude usually becomes a prejudice when the predisposition is so strong that no attention is paid to evidence that might call for a change reaction. If a person says that all government employees e.g. a staff of FCDA Abuja accepts bribe he is showing an attitude of corruption and if he refuses to accept bribe it proofs that many FCDA staff are honest, he has developed a prejudice.

Attitudes are formed as a result of some kind of learning experience. In most cases, the experience is single, dramatic or damaging event. For example, if a member of a certain sanitation monitoring team molests a person, he may thereafter dislike all members of that group. Attitude may also be learnt by following the example or opinion of a friend, teacher, or parent. For example if a child may take on his parent's prejudices about sanitation. Attitude is often built up more slowly. Growing up in a happy and nature loving home may contribute to favorable attitudes towards environmental sanitation. In addition to the home important builders of attitude are schools, churches and media like newspapers, radio, and television. The agencies that help form attitude can also change and though reshaping a deep prejudice may take years of effort or even become impossible.

The attitude people hold can profoundly influence the way they act in personal and longer situations. This is why psychologists and sociologists are concerned with how attitudes are formed, how they affect behavior and how they can be changed. To study attitudes, social scientists have prepared measuring scales. One form of scale requires a respondent to read a number of statements ranging from strongly favorable to strongly unfavorable, about a topic such as sanitation, which is the topic of this research. He then picks the statement he most fully agrees with. For example, a scale to assess attitude about sanitation might include statement ranging from environmental ethics, environmental ethics, environmental actions and in-actions. Responses to a number of such items can be given a

numerical number or score.

What are referred to as Local Governments in States are designated Area Councils in Abuja, the Federal Capital Territory (F.C.T). Kuje is one of the six area councils of F. C. T It covers a land area of 1,800 square kilometers or nearly 22.5% of the F. C. T. as mentioned earlier. Kuje is not spared from the rush of people into F. C. T. as a result of which the population is increasing rapidly. The population is estimated to about 120,000 people. The headquarters of the council is Kuje town, which is about 30 kilometers from the main town – Abuja

The council has varied geographical distribution while some areas are flat lands; others are hilly and mountainous as a result of which some areas are very difficult to reach. To reach some areas, one has to go through some neighboring states covering several kilometers.

The area council like other areas of F. C. T. started participating in NIDs - National Immunization Days in 1996 and since then the activity has been carried out like in any other part of Nigeria. The council also participated in the last SNID - Sub National Immunization Days conducted in July 2000. During the exercise, 21,774 children were immunized out of 23,430 projected number of children.

In view of the availability of basic infrastructure and facilities and nearest to both the city and the International Airport, the area council has constructed layouts for both residential and industrial estate at Kuje and Chukuku. The area council is liberal in its plot

allocation policy in order to enhance rapid development. Tourism and the hotel industry also have a lot of future in the area council. The door is opened to industrialists and investors particularly those who are interested in establishing tourists' resorts, parks and recreation centers.

Kuje area council has vast potential natural resources that would serve as incentive to investors and industrialists. These people can also tap the rich mineral resources of the area council. There are large marble deposits at Kusaki for the production of marble chips and tiles for the building industry. Large quantities of clay deposits are also formed at Gbanfa and Gyara towns, which are noted for the production of beautiful pottery ware got in Chibiri, River Bobo and Game Reserve area at Kobi.

The council is determined in its determination to bring about accelerated socio-economic development in Kuje area council and has proposed to establish an international multipurpose market and the development of housing estate.

Kuje town already has a number of important establishments, some of which include: A medium security prison, F. C. T Prison

Command Headquarters, National Population Commission of Nigeria, National Orientation Agency, Peoples' Bank, National Electoral Commission of Nigeria, Immigration Service Unit, Nigeria Agricultural Co-operative Bank Collection Center, The Federal Civil Aviation Authority Quarters and NALDA F. C. T headquarters.

However, the proposed Socio-Economic Development Projects are:

1. Construction of Kuje Housing Estate.
2. Establishment of Kuje International Multi-purpose Market.
3. Construction of International Electronics market.
4. Construction of Kuje Holiday Inn or Resort.

For proper environmental planning, 12,000 household bins of various categories were distributed to residents. These bins were regularly serviced through an active waste collection process. The environmental services were extended beyond the city. Waste collection was also intensified in other satellite towns like Nyanya, Karu, Karshi, Kubwa, Bwari e. t. c.

In order to guarantee a healthy and pollution free environment, a mini sewage treatment plant at Wuse and 12 aerators have been completed and put in use. The main sewage treatment and

interceptors sewer projects have also been resuscitated and applicable process is being made towards their completion.

Emphasis is placed on all the maintenance of sewer lines in the capital city, a newly completed public and private buildings are hooked up to the central sewage system to control sewer - outs.

As a result of this fact, 6 zones of illegal dumping site in Kuje town are noted, which include: Sundaba, Kayarda, Low cost, Wuru /Sauka, Pasali and Angwangade. All these zonal illegal dumping sites must be checked, in order to avoid more environmental hazards in the study area.

3.3 DEFINITION OF TERMS

SEWAGE

Sewage is not just made of human excrement and water. It can also contain hundred of toxic chemicals and metals which enter the system from households, business and industrial operations. These toxins come from solvents, detergent, cleanser, ink, and paints and in multitude of other ingredients or modern households and business. Sewage also includes debris such as gravel, grits, tampons, condom, rags and hair. Tons of food waste from sinks grinder adds to the load. Everything that pours down the drains or flush down in a toilet ends up as sewage.

SEWER

As defined by Steel and McGhee “ this is a pipe or conduit generally closed but normally not flowing full, for carrying sewage”

SEWERAGE

This is defined as “the art of collecting, treating and disposing of sewage”

SEWAGE/SEWAGE WORKS

These are comprehensive terms covering all the structures and procedures for collecting, treating and disposing of sewage.

COMBINED SEWAGE SYSTEM

This is the discharge of fowl or soil sewage to the same sewer as run-off of rain from roofs and road.

SEPARATE SEWAGE SYSTEM

This is defined by Escritt.L.B. As the discharge of soil sewage to soil, sewers from which surface water is excluded; and surface water from roofs and roads discharge to surface water sewers.

MANHOLE

This is defined by Woolley L. as a chamber constructed on a drain or sewer having a removable cover, which permits entry for inspection and testing, maintenance, clearance or obstruction and removal of debris.

SURCHARGING

As defined by Reiner and others, it is a situation where there is

slight excess flow in a gravity sewer, and water fill up the manhole.

SEWAGE TREATMENT

As defined by steel and McGhee, it covers any process to which sewage is subjected in order to remove or alert its objectionable constituents to render it less dangerous or offensive.

SEWAGE DISPOSAL

As defined by Steel and McGhee, it applies to the act of disposing of sewage by any method; it may be done with or without previous treatment of sewage.

SEWAGE GENERAL CONSIDERATIONS

Providing adequate sewage for an urban area required careful engineering. The sewers must be adequate in size or else they will overthrow and cause proper damage, danger to health and nuisance. Adequacy in size calls for estimation of the amount of sewage and use of hydraulics to determine proper size and grades of the services. Another important consideration is the velocity of in the sewers. If not great enough, deposit of solid will occur with accompanying odor and stoppages. After the sewage is collected, it becomes a liability to the city because of its potential danger to health and possible production of nuisance in streams.

The degree of treatment required depends upon the water quality standards applicable to the receiving stream and the flow and quality of both the stream and the waste. In no case is treatment that

produces effluent containing more than 30mg/l BODs and 30mg/l suspended solids considered as adequate for new construction.

3.4 IMPORTANCE OF SEWAGE DISPOSAL

The importance of treating sewage before it is ultimately disposed cannot be over emphasized.

Sewage should be treated before it is ultimately disposed in a receiving watercourse in order to

- a. Reduce the spread of communicable disease caused by the Pathogenic organisms in the sewage.
- b. Prevent the pollution of surface and drain water.

These two reasons are interdependent to the extent that a polluted body of water is a potentially and frequently and actual source of infection, particularly in hot climates. However, there is now an increasing awareness that pollution and contamination of the environment is most undesirable in itself and that therefore measures to abate pollution should be judged from an ecological stand point rather than merely by this improvement they make to the human condition. Nevertheless, in most tropical developing countries, the relative scarcity of funds and desperate need for sanitary facilities will ensure that for many years to come money will be spent primarily on measures directly designed to improve the well being of the people (water supply, sewage disposal, mosquito control etc.), rather than on improving the environment for its sake. Mara (1976, Pg. 5-6).

3.5 METHODS OF SEWAGE DISPOSAL

There are two methods of sewage disposal namely

Conservancy methods

This is the method of disposal of sewage for isolated buildings or communities that cannot be served by the main sewer system.

Conservancy sanitation has been defined as "sanitation by keeping refuse matter in privies, pails, earth, closets and cesspools for its periodic removal. Other types of disposal system under conservancy method include soak away, pit latrines, VIP latrine, septic tank etc.

Water borne system

Sewage is conveyed in pipes known as sewers from its place of production to its place of treatment and disposal in this method. It is undoubtedly the best system but it is capital intensive and many communities in the need of sewerage cannot afford to install full network of reticulation and trunk sewer. Mara (1976, Pg. 7).

3.6 WASTE WATER MANAGEMENT

There are three constituents and interrelated aspects of wastewater management:

- i. Collection
- ii. Treatment
- iii. Re-use

Collection: collection of domestic wastewater is best achieved by full sewerage (water carriage) systems. Unfortunately, this method is the most expensive and there are relatively few communities in hot climates, which are able to afford it.

The collection work can be done either by the combined or separate sewage system.

Treatment: conventional treatment is the term used to describe the standard of sewage treatment in temperate climate. It comprises of four stages

- a. Preliminary treatment
- b. Primary treatment
- c. Secondary treatment (bio-filtration or active sludge)
- d. Sludge treatment (anaerobic digestion of the sludge produced in stages 2 and 3) Mara (1976 Pg. 53)

Effluent the use

The general scarcity of water in the tropics and the high cost of Developing new water supplies and the two major factorized Responsible for the increasing recognition of the need to conserve Water resources by effluent re-use. Also, human wastes are valuable Natural resources and should be re used whenever practicable.

These are essentially different systems for re-use

- Agriculture
- Aquaculture
- Biogas production
- Municipal re-use

Agricultural re- use: both night soil and sludge may be used to enrich the soil. The direct application of night soil as an agricultural fertilizer has been practiced for centuries in many part of the world, but this practice involved very substantial health hazards to agricultural workers and to consumers of the crop grown, and is not recommended. However, sludge could be digested or composed with organic refuse and vegetable matters before application to the land

(Cairncross and Feachem 1983, Page 139).

Aquaculture: This means water farming. It is the growing of plant and animals in water for their eventual harvesting as foods, either for man or for animals. Mara (1976, pg. 127)

Biogas : Night soil, mixed with animal waste can be used to generate Methane or biogas. This technique has been applied in India, Korea and China where nearly one million biogas plants are in use. In a warm climate, a biogas plant can meet the fuel needs for cooking and lighting of a family of five people. Cairncross and Feachem (1983, pg 127, 139 and 140)

Municipal re-use: Effluent, which has received tertiary treatment, which includes chlorination is suitable for watering Municipal Park, Golf and street flushing, it is often cheaper to use effluent for this purpose than fully drinking water. Mara (1976, pg. 134).

3.7 PERFORMANCES CRITERIA FOR WASTE WATER SYSTEM

The ideal system will satisfy all of the following criteria

1. **Health criteria**: - Pathogenic organisms should be spread either by direct contact with night soil or sewage or indirect via soil, water or food. The treatment chosen or practiced should achieve a high degree of pathogenic destruction.
2. **re-use criteria**:- The treatment process should yield a self production for re-use, preferable in aquaculture and agriculture,
3. **Ecological criteria**: - In this case (and this could be considered exceptional) when the waste cannot be re-used, the discharge

of effluent into the surface water should exceed the self - purification capacity of the recipient water.

4. **Nuisance criteria:**-The degree of odor release must be below the nuisance threshold. No part of the system should become aesthetically offensive.
5. **Cultural criteria:** - The method chosen for waste collection, treatment and re-use should be compatible with the local habits and social (religious) practice.
6. **Operational criteria:**- the skill required for routine operation and maintenance of the system components must be available locally or as such that can be acquired with only minimum training.
7. **Cost criteria:** - capital and running cost must not exceed the community's ability to pay. The financial return from re-use scheme is an important factor in this regard. Mara (1976, pg21-22)

3.8 ESTABLISHMENT AND FUNCTION OF ABUJA ENVIROMENTAL PROTECTION BOARD

The Abuja Environmental Protection Board (AEPB) was Established in July 1989 under the ministerial leadership of Major general Gada Nasko(rtd). It is backed by AEPB decree No. 10 of 12th August 1997, which came into active effect? ? from July, 1989, when the board came to be.

For effective management of organization, the organizational Structure of the board was in 1996 recognized into the following

functional department and units.

- i. The board secretariat administration
- ii. Personnel management
- iii. Finance
- iv. Engineering and leadership services \public health
- v. Solid waste management and sanitation
- vi. Orchard plant nursery conservation
- vii. Legal unit
- viii. Planning, research and statistics
- ix. Workshop, purchasing and supply
- x. Liquid waste
- xi. Public relations
- xii. Internal audit
- xiii. Inspectorate audit

A director, who is the chief executive, is heading the board. The capital environment (1997, pg. 2-3)

OBJECTIVES OF AEPB

- i. To secure a quality environment adequate for the health and well being of the residents of the Federal Capital Territory
- ii. To conserve and use the environment and the natural resources for the benefit of the FCT generations
- iii. To minimize the impact of physical development on the ecosystem of the country's new FCT
- iv. To raise public awareness and promote understanding of essential linkages between environment and development

3.9 URBAN ENVIRONMENTAL MANAGEMENT

PROBLEMS IN NIGERIA

In view of the above, it must be re-emphasised that the volume of waste generated per second does not invariably measure the degrees to which the environment will be polluted. Thus, if the waste can be evacuated and disposed of satisfactorily, and as far as it is generated and collected there, there would be no accumulation and hence no insult, abuse and pollution. It is when evacuation and disposal perpetually lag behind that the rate of generation and disposal of solid waste becomes an environmental nuisance. Solid wastes management therefore concerns the interplay among generation, storage, presentation, collation and disposal.

In Nigeria, there are two broad systems of solid waste management, namely: public and private, the former being the more conventional and traditional. In the public solid waste management system, the waste disposal unit seems to have been the most common arrangement of which have at different times been established in Ibadan, Benin city, Enugu, Onitsha, Warri and Kaduna among other urban centers in 1985. Usually, the waste disposal unit

is often established at the Local Government level under the responsibility of the health superintendents. The unit is especially operational in the area of locating public garbage collection centers where the public collect their domestic waste and ensure that they are disposed off properly.

The following difference between the private and public system could be seen as a factor contributing to the poor level of waste management system in Nigeria.

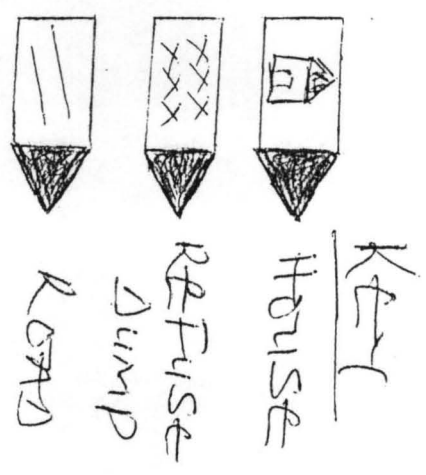
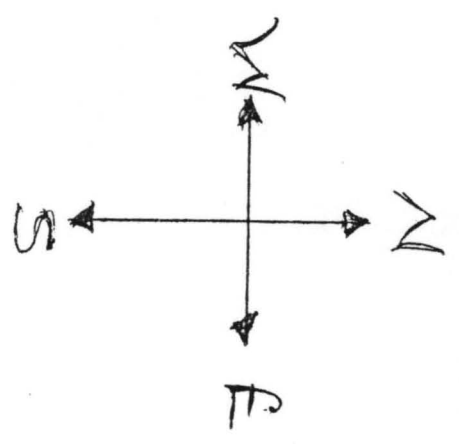
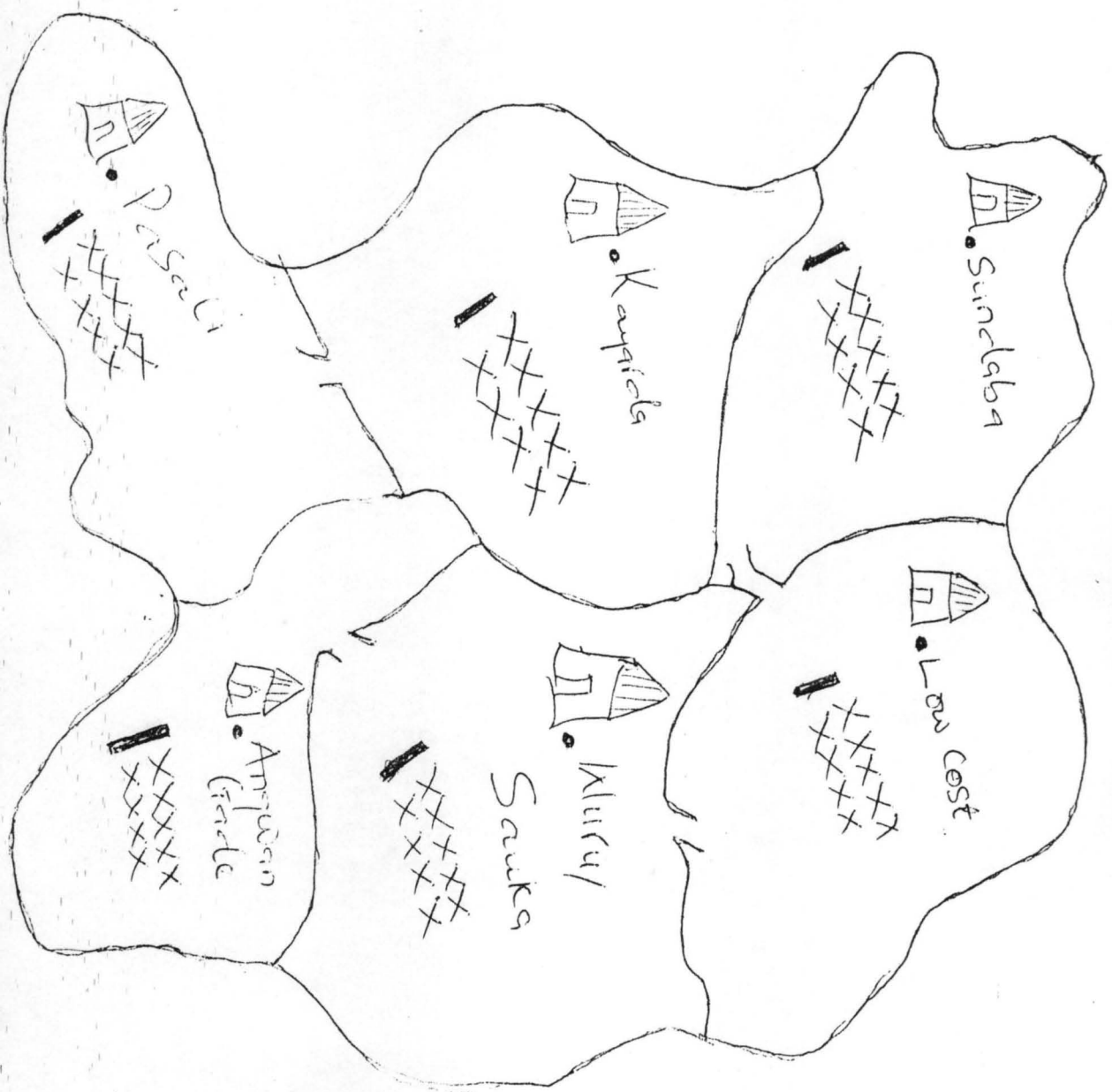
- (i) The public is seen as a public social service, while the private is a contractual arrangement between the private firm, institution or the individual beneficiary.
- (ii) The public system is a free service venture, while the private requires user charge.
- (iii) The public is expected to operate on a comprehensive coverage or more of where more refuse are generated, while the private operation is based on affordability.
- (iv) While public depends on the use of report for refuse display for collection, the private operates on house to house basis.

The data collection from the field of survey is been analyzed and presented in this chapter. Some of the issues to be discussed are the different zones of illegal dumping site in Kuje town, which include Sundaba, Low-cost, Wuru/Sauka, Kayanda, Pasali and Angwan Gade. Indication of environmental sanitation as appropriate in Kuje Area Council, their description, location, distance control condition and remarks are some of the factors analyzed for the proper management strategies ranging from general station, refuse disposal, market sanitation, eating houses, bakery, native liquor houses, meat inspection and water supply had been implemented based on the result achieved.

The management of environmental pollutant has become one of the most important issues in the affairs of man. In most urban centers, the major problems of waste is that the rate of generation and level of the management are not commensurable to one another. However, it is quite evident that whatever the rate of generation might be, if the storage and the disposal as well as treatment are done effectively, the issue of waste constituting environmental problem

Fig. 3.1.

ZONES OF ILLEGAL DUMPING SITE IN KULJE TOWN



Source: ... Kulje Area Council headquarter

would be a minor one.

Recorded environmental management strategies involving environmental sanitation were indicated as appropriate such as description, location, distance, control, condition and remarks are noted during the period of research.

ENVIROMENTAL SANITATION AREA INDICATED

BY KUJE AREA COUNCIL AS APPROPRIATE

DESCRIPTION	LOCATION	DISTANCE	CONTROL	LOOSE	CONDITION	REMARKS
REFUSECOLLECTION	KUJE, SAUKA, INEC, WURU, KAYARDA1&2, ANGAWN GADE, MARKETS AND PASALI	1/4KM	EVACUATION	_____	ACCUMULATED	PROMPT REMOVAL
NUMBER OF DUSTBIN	4 AT DUMPING SITE, 6 AT SECRETARIAT	1/4KM	REMOVAL	_____	ACCUMULATED	WEEKLY
SANITATION	ROUTINE INSPECTION	1/8 KM	TIDY ENVIRONMENT	_____	GOOD	TIDY
HEALTH EDUCATION	WEEKLY KUJE CLINIC	1/8 KM	MOBILIZATION	_____	AWARNESSES	AWARNESSES
WATER SUPPLY	BORE HOLE AND HAND PUMPING MACHINE	1/8 KM	WHOLESOME	_____	CLEAN	INADEQUATE WATER SUPPLY

1. Refuse collection: - Different location such as Kuje, Sauka, Inewuru, Kayanda 1 and 2, Anguwan Gade, Markets and Pasali. The refuse collection center having a distance of $\frac{1}{4}$ km. The control involves evacuation. Because of accumulated condition, prompt removal to the final dumping site is required.

2. Number of dustbin: - four at dumping site six at council secretariat, with a distance of $\frac{1}{4}$ km. Control is by removal. The conditions of the dustbin are said to be accumulated and weekly removal was proffered.

3. Sanitation: - Routine inspection is required due to the effect of waste on the general environment. Having a distance of $\frac{1}{8}$ km and its control require mobilization involving the creation of adequate awareness, leading to a tidy environment.

4. Health Education: - This usually takes place every week in Kuje clinic. The recorded distance is described as $\frac{1}{8}$ km. Control is by mobilization and just like sanitation processes, it requires maximum awareness, hence enhancing proper awareness about the environment.

5. Water Supply: - Generally, water is very important. Bore hole and hand pump at Kuje, Pasali, Kuji and Chibri are well located. Having a location of 1/8 km with a wholesome control. The water condition at the different location can be regarded as clean. Despite all the location centers, the water supply is termed inadequate.

In many areas of Nigeria, Kuje inclusive, one out of every two children born dies out of diarrhea, pneumonia, malnutrition complex before reaching the age of five. This statistics should place the problem high on any health planner's agenda, although there are probably other health problems with greater social and economic impact on the nation.

Strategies for reducing these complex problems are mutually reinforcing. The modern water treatment and distribution system and waste disposal system, health delivery systems and agricultural development program envisioned for FCT could play a significant role in controlling this disease complex in Nigeria's children.

Waste management: - under this, two major procedures are discussed which are: -i. Wastewater management: - development of wastewater management plans for the new capital city requires

consideration of two types of issues. First, treatment and disposal of sanitary wastes must be conducted in a manner to control disease vectors and generally to contribute to the objectives of maintaining public health. Major diseases of concern include Schistosomiasis, Onchocerciasis and malaria in addition to the more familiar enteric disorders. Engineering safe guards must be provided in waste management systems for harzia snail, simulium (black fly), and tsetse fly, in addition to provisions for control of pathogenic.

Second wastewater effluent given adequate treatment may represent valuable resources for agricultural irrigation or water supply for other towns and villages in the FCT.

Solid Waste Management: - The primary focus of solid residuals in a manner which utilizes the residuals as a resource, protects public health, and utilizes management system which can be with semi-skilled or unskilled staff. In consideration of the health related issues for the FCT, the collection and disposal of solid residuals emanates from other settled areas within the FCT also is essential to meeting the objectives as stated.

Food wastes, which are highly putrescible and will decompose rapidly; rubbish such as paper, plastic, glass, broken clay pots, cans, wood, reeds, straw etc

STRATEGIES INVOLVED IN ENVIROMENTAL MANAGEMENT EFFECTIVENESS IN KUJE AREA COUNCIL UNDER THE PRIMARY HEALTH CARE, ENVIROMENTAL OCCUPATION SERVICE DIVISION ARE:

1. Keep your tenement and its surroundings free from filth, rubbish, refuse of all description
2. Provide your tenement with a covered dustbin for depositing refuse of all description.
3. Provide sanitary conveniences: - provide adequate toilet, kitchen, and bathroom accommodation in your premises.
4. Desist from indiscriminate defecation in and around your premises.
5. Desist from throwing, littering or accumulating filth, dirt and refuse of all form on the street, air space, public open space, ports, square and monuments.
6. Dislodge the contents of your over filled pit latrine, septic tank or soak away pit.

7. Cut and clear away over grown weeds in your premises.
8. Clear dirty drainage around you.
9. Remove illegal sanitary structure around your premises.
10. Provide adequate toilet, Kitchen and bathroom accommodation premises

3.10 TACKLING ENVIRONMENTAL PROBLEMS

Environmental problems are diverse, which the language of addressing them, varies globally, subject to environmental nuisance considered crucial in any given community. Furthermore, environmental problems cannot be simultaneously or permanently eradicated but tackled in order of priority, without prejudice for a comprehensive knowledge of their existence.

In this part of the world, industrial growth is still abysmally low but this is without prejudice to the need for the environmental managers to be reasonably equipped with strategies for addressing industrial pollution, particularly in relation to water supply. Solid waste, however, is an acute environmental problem of high priority which equally has contributing effects on underground and surface water quality. The increasing use of agro-chemicals in modern

farming demands a good knowledge of their side effect in form of chemical pollution of land.

It is, indeed, ironical that no matter how much concern the public sector may have for sustainable development which demands sound environmental management, the task is colossal making it practically impossible for government to put in place an elicited arrangement which will ignore community participation.

In very simplified form, the environment is primarily in three components: water, land and air. The management of each component demands its own peculiar awareness while balanced environmental management calls for an awareness of the mutual impact of the activities relating to all the components.

Where does the task of environmental management begin, taking into consideration the prevailing level of environmental degradation world-wide? If environmental degradation is functionally related to population, escalating as consumption which arises from growing population also increases, measure for quantitative and qualitative control of human population will address environmental problems in two ways .

Firstly, it will tend to reduce the quantum of environmental degradation through the quantitative population control strategy as a result of reduced consumption arising from reduced population.

Secondly, it will help to promote an environmentally conscious community through the quantitative population control via concerted education.

In effect, sound environmental management rationally become a joint responsibility of both the public and the private sectors. If the current level of community property is duly considered, the industrialized chapter of the private sector as well as foreign government, international organizations, patriotic individuals and elitist clubs are the only reliable participants that can make meaningful technical and financial contribution to improve the environment in its current highly degraded form, moreso that the required input is capital-intensive.

In the entire chain of modern environmental management, the role of the mass media is virile link. Except our press can mobilize her resources to penetrate the heart of the community, there will be continuous but avoidable gap in our environmental achievement which

will recoil against and jeopardize our social and economic development.

Hence, environmental management is a joint responsibility of both the public and the private sector.

CHAPTER FOUR

4.0 RESEARCH METHODOLOGY

Strategies for the implementation of the environmental policy, in the study area (Kuje Area Council). The policy on environment provides the following strategies for the implementation of its objectives:

- (1) Evolving clear guidelines for resources use and development.
- (2) Articulating long term and short term objectives and appropriate regulations for environmental protection and social development.
- (3) Explicit incorporating environmental consideration as integral part of all projects planning, review and implementation.
- (4) Arranging responsibilities and providing clear guideline for reclamation and rehabilitation of the environment after project decommissioning.

(5) Providing appropriate regulation back by incentives to ensure good agricultural, industrial and transportation and desertification.

(6) Considering environmental management issues, what is required to achieve the above stated objectives include:

- a. Legal instruments to implement them
- b. Institutional framework for policy implementation.

Among the most important strategies involves the creation of awareness or educating the people and the use of questionnaire.

Secondary Source: These are data collected in the process of this research work from textbooks and journals.

Primary Source: These are data collected through questionnaires, Interview and personal observation.

It is important to stress that two characters of questionnaire were prepared and administered. In the first characters of questionnaires a total number of one hundred and twenty(120) were administered using random sampling of 100 percent sample size among the community of the study area (Kuje). In essence, the questionnaires were used to determine the

100 percent sample size among the community of the study area (Kuje). In essence, the questionnaires were used to determine the environmental strategies, which are available in the study area kuje Area Council

4.1 DATA COLLECTION

Data were collected specially, from two major sources from the conception of this research work through the library and questionnaire. The research work follows clearly the trend of the research topic which stated the strategies involved in the solving of environmental problems that were equally made, which form or serve as the hypothesis to be tested.

Hence, some of the available data were collected directly from the kuje Area Council, which aid the speedy analysis of this research work.

4.2 DATA ANALYSIS

RESEARCH AREA

The research area is kuje Area Council of the Federal capital territory. The Population of Kuje Area Council is approximately 120,000 (one hundred and Twenty thousand).

Instrument for data collection: instrument for data collection is structured questionnaire 1-8 item, it was used in eliciting response.

Suspicious that personal prejudice and ignorance may invalidate responses, the researcher had personal interaction with respondents.

The questionnaire administered is 120 (one hundred and twenty) in all and they were all returned.

Method of data presentation: percentages, tables and bar charts were used to analyze responses to the research questions. It is based on the sanitary system and its management where in the source of water, way of disposing refuse and toilet facilities is being considered.

The percentage is obtained using this mathematical analysis

$$\% = \frac{\text{Number of response}}{\text{Number of questionnaire}} \times 100$$

Number of questionnaire 1

The above methods were employed and used for the discussion of result in chapter five.

CHAPTER FIVE

DISCUSSION OF RESULT

Research question 1

Do inspectors inspect your house? If yes how often?

(a) Houses visited by inspectors = 21 = 17.5%

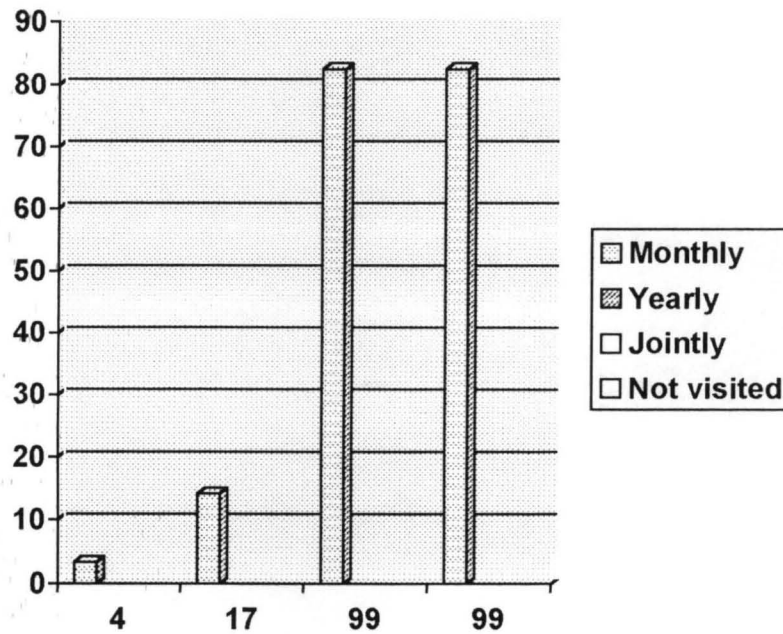
Table 5.1 : Inspected houses

Duration	Frequency	Percentage (%)
Monthly	4	3.33
Yearly	17	14.17
Joint visit	99	82.5
Total	120	100%

(b) Houses not visited by inspectors = 99 =82.5%

From the above table (table 5.1), it was found that inspectors visit various houses in the study area is not adequate because only 3.3% of the respondents' houses were visited monthly, while about 14% houses were visited yearly. Houses not visited accounted for about 82.5%. This indicates that inspectors do not carry out their official duty in the study area. This can also be seen in fig. 5.1 below.

Figure 5.1



Source: compiled by the author

Research question 2

Is there any refuse disposal in your house? If no how are wastes disposed?

- (a) Houses with available refuse disposal facilities = 40
- (b) Houses without refuse disposal facilities = 80

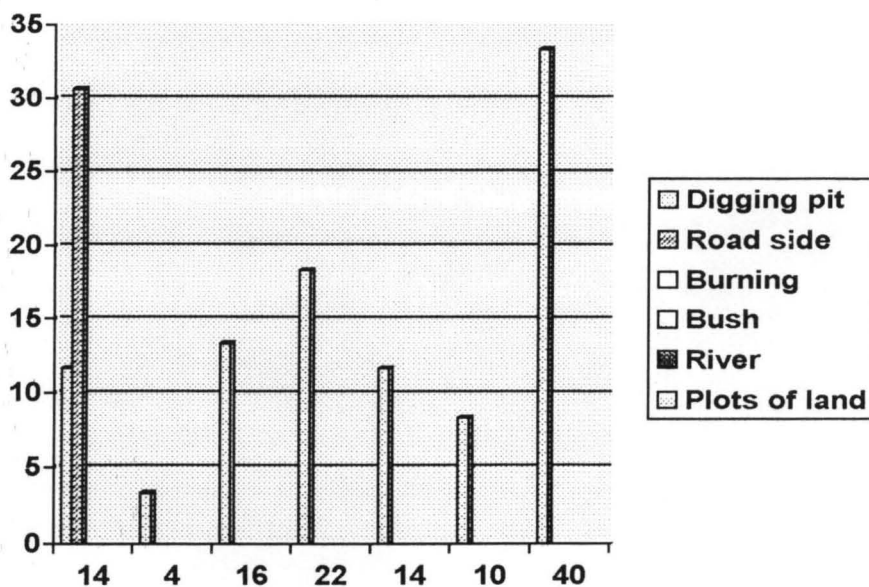
Table 5.2: Refuse disposal facilities

Means of disposing refuse	Frequency	Percentage (%)
Digging pit	14	11.67
Dropping by road side	4	3.33
Burning refuse	16	13.33
Throwing refuse in	22	18.33

bush		
Throwing refuse in river	14	11.67
Throwing on plots of land	10	8.33
Others	40	33.34
Total	120	100%

From table 5.2 above the ratio of houses with refuse disposal facilities is considerably small to the ones without refuse disposal facilities. This can easily result in environmental pollution which can bring about outbreak of epidemics. This can also be seen in fig 5.2 below.

Figure 5.2



Source: compiled by the author

Research question 3

Indicate if your house is using any of the following toilet system?

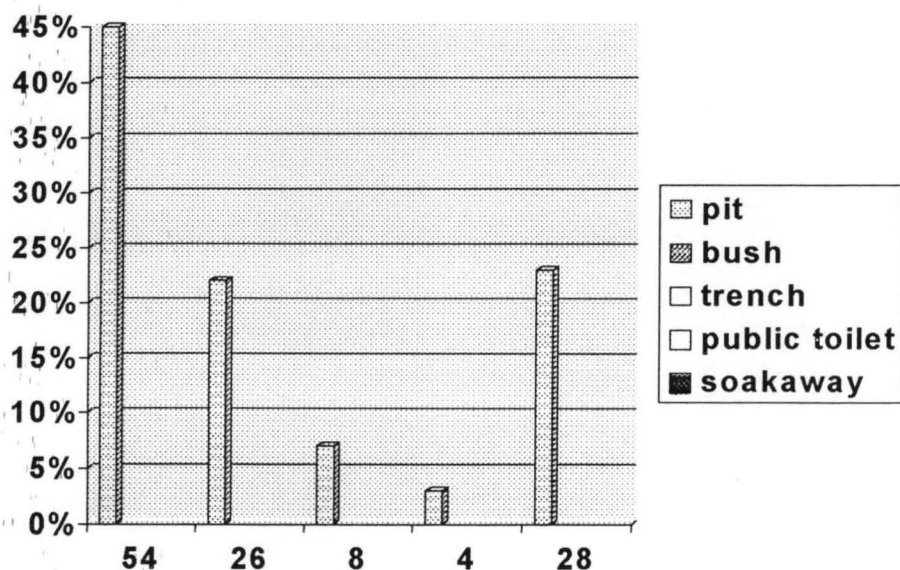
Table 5.3: Toilet system

Toilet system used	Frequency	Percentage (%)
Pit latrine	54	45
Bush	26	21.67
Trench	8	6.67
Public toilet	4	3.33
Soak away	28	23.33
Buckets		-----
Total	120	100

Source: compiled by the author

From the table above it is observed that most houses make use of the pit latrine. This is not too hygienic because it is not every one that is taking good care of the toilet. This is also depicted in *Fig 5.3* below

Figure 5.3



Source: compiled by the author.

Research question 4

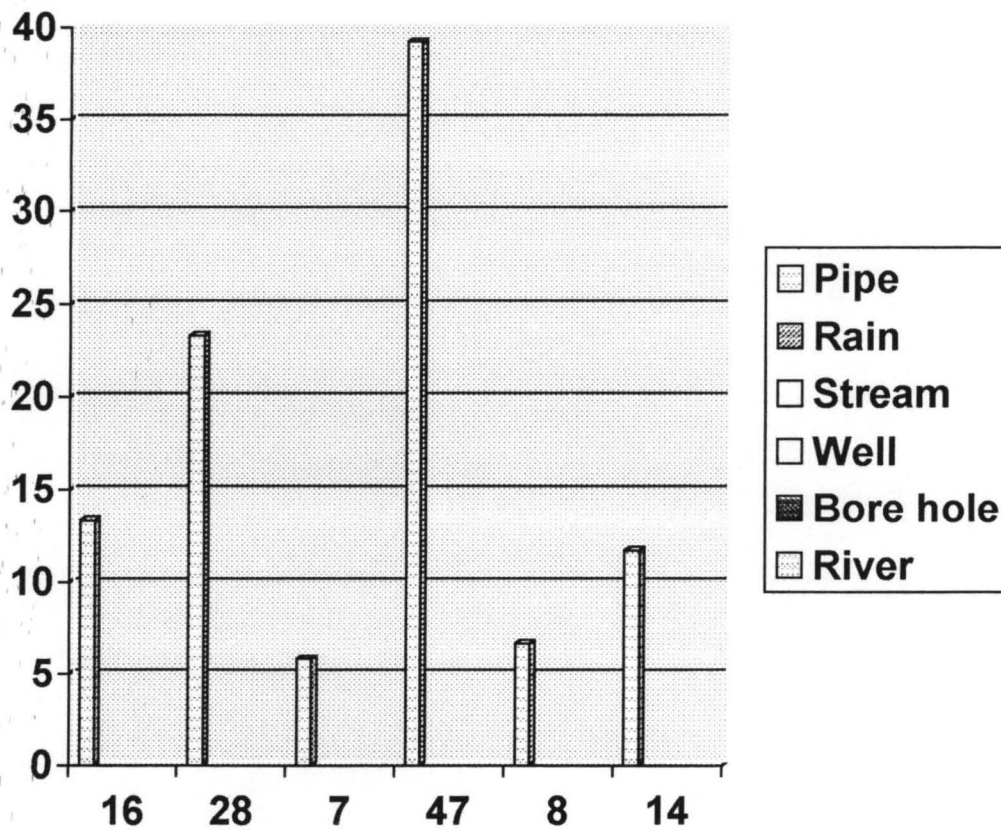
How do you obtain water?

Table 5.4: Ways of obtaining water

Ways of obtaining water	Frequency	Percentage (%)
Pipe borne water	16	13.3
Rain water	28	23.3
Stream	7	5.8
Well	47	39.2
Bore hole	8	6.7
River	14	11.7
Total	120	100

From the above table it is observed that most respondents get their water from the well. The disadvantage is that some of these wells are located close to pit latrines, consumption of such water is hazardous to health. This is further depicted in figure 5.4 below.

Figure 5.4



Source: compiled by the author

The inference drawn from the analyzed data forms the basis for the Proposal.

In addition, recommendation, implementation and monitoring is the last stage in this research methodology, which is relevant if need arises.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

The following are the ways by which the environmental management strategies can be achieved:

- i. From the observation houses inspected by inspectors, have most that it needs to have a good environment on ground but the rate of inspection is still low.
- ii. Houses with available refuse disposal are quite minimal and means of disposing refuse by most inhabitants quite unhealthy which is causing high level of pollution and may lead to health hazards this reveals that environmental policy and strategies are yet to be efficient and operational.
- iii. Toilet system used by majority is not too healthy and it can lead to out break of epidemics.
- iv. Ways of obtaining water is moderately adequate but can still be improved on.

It can be said that the policy of keeping the environment clean are not strictly adhered to, hence it should be properly

order to prevent further degradation of the environment.

In my opinion, the various ways in which the environment can be kept clean include the following: -

a. Management of environment hazards, including transportation and use of all hazardous waste generated through research, academic and service support staff operations must comply with the applicable Federal and state structures and their associated rules and regulations.

This method of control is designed to provide safe, efficient and responsible way to manage hazardous materials and wastes as required by Federal and state regulations controlling hazardous materials from the time the materials are acquired through proper disposal.

1. Health hazards: -means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur on exposed employees. The term "health hazards " includes chemicals which are carcinogenic, toxic or highly toxic agents, reproductive toxins, irritants, neurotoxin

agents which acts on the hematopoietic system and agents which damage the lungs, skin, eyes or mucous membranes.

2. Physical hazards: - means a chemical for which there is scientifically valid evidence that is a combustible liquid, a compressed gas explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive or water reactive).

Users are responsible for identification of hazardous materials that they acquire or may be located on the laboratory or facility. All hazardous waste must be accumulated and stored in compliance with the satellite accumulation and waste storage policies. The satellite accumulation policy provides guidance on proper labeling, handling, and accumulation of wastes prior to transferring them to hazardous waste. The user is responsible for monitoring the time limits and contacting the director of environmental management regarding disposal.

Outdated and off-specification laboratory chemicals must be handled as hazardous waste. A chemical is a hazardous waste if it has one of the following characteristics or is listed as such by the Environmental Protection Agency:

Environmental control factors:

(a) Ignitability: - Ignitable waste (a non -liquid) is considered ignitable if it is capable of causing fire through friction, absorption of moisture or spontaneous chemical changes and burns in such manner that creates hazards e.g. alcohol, paints, thinner, sodium sulfide, nitric acid.

(b) Corrosivity: - corrosive wastes are generally aqueous solutions e. g. acetic acid, sulfuric acid, and sodium hydroxide.

(c) Toxicity: - Toxic wastes, some examples of toxic wastes are arsenic, chloroform, mercury, pyridine, lead and silver solutions.

Hazardous waste accumulated at or near the point of generation shall be managed in accordance with the satellite accumulation policy. It is imperative that the satellite accumulation containers be properly labeled and kept securely closed. Broken fluorescent bulbs must be treated as hazardous wastes.

When a waste is 90% full, or approaches an accumulation time of one year, contact the director Environmental Management to pick up the waste. The waste must be removed within 72 hours. *The*

management before the container is completely full or before the end of the year.

The volume of waste (solid waste) generated in Kuje does not invariably measure the degree to which the environment will be polluted. If the waste can be evacuated and disposed off satisfactorily as soon as generated and collected, there would be no accumulation (storage collection and disposal) though these factors differ from one place to another due difference in institutional structure and level of awareness, on this basis, problems or factors affecting the efficiency and effectiveness of management of environmental program in Kuje focuses mainly on environmental pollutants.

The environmental review process was developed in response to the recognized need to consider the environmental consequences of a particular action before its implementation. The overriding objective of the environmental review is to recognize potential impacts, conflicts and problems early as possible so that they may be evaluated and environmental degradation minimized.

Therefore, for the effective and efficient management of

environmental program in kuje, there is need for well-defined law to give both the activities of the board and the support of the public. Provision of adequate facilities and equipment will go along way in the improvement of the system and not only that management should be considered very seriously, that is in the area of supervision, decision on new technology, personnel and enlightenment campaign.

6.1 SUMMARY OF FINDINGS

COLLECTION: - the collection of solid wastes involves the development of a two step functional system namely an on-site handling, storage and processing system and a coordinated collection system to transport collected solid waste materials to a central disposal area. Both systems entail the use of standard sanitation practices to minimize public health and aesthetic impacts.

Public health concerns are related primarily to the infestations of areas used for the storage of solid wastes with vermin and insects that often serves as reservoirs of diseases. The effective vermin control measure is proper sanitation. Aesthetic considerations are related to the production of odor and the unsightly conditions that can develop from lack of sanitary

conditions.

The use of proper containers not only reduce collection time, it often results in lower labor force requirements and invariably improve disease vector and vermin control. Due to the benefits gained versus the relatively low cost involved, the following recommendations are made regarding containers and collection points

a. Residential wastes: - curbside collection, metal or plastic containers with tight fitting lids, having a capacity of approximately 75 litres.

b. Non-residential waste: - curbside or alley collection, putrescible waste in covered 75 litres containers or larger and non-putrescible waste in similar containers with no lid requirements.

In both cases, collection should be made at least twice weekly, with special collections from specific customers are required.

i. Residential solid waste will be generated at the rate of 0.5kg per capital day and will have an uncomplicated density of 120kg/m^3 .

ii. Non - residential solid waste will be generated at the rate of 0.3kg per capital per day and will have an uncomplicated density of 180kg/m^3 .

- iii. The in-place (compacted) solid waste at land fill sites will be 450Kg/dm^3 .
- iv. The collection frequency will be twice weekly.
- v. All collection points will be accessible to the collection equipment.
- vi. The composition of the solid waste stream will be compatible with the use of metal or plastic containers and will be such that it can be hauled by tractor - trailer combination or loaders.
- vii. All waste paper produced by Federal Government institutions will be recycled, no other resource recovery programs are assumed to be in use.

6.2 SUMMARY

Abuja Environmental Protection board should establish refuse centers in all parts of the town that are not accessible by the existing compacting truck (waste collection vehicles). Although, house to house collection system being used but it can be observed that such can only be done within government quarters, in order to tackle solid waste problems in totality, other parts that are accessible should be provided with neighborhood collection centers.

Management plays crucial roles in any organization or operational activities because it revolves around handling of resources (man, money and material) against the background, the following recommendations are made in order to improve the management aspect of the solid waste disposal system in the study area.

To improve the efficiency and effectiveness of the environmental Protection board, the following managerial function should be improved on

Collection of rates: - The board should determine the most appropriate money payable by the general public for the service they rendered to the public in areas of waste (solid) management. By ensuring the bill is presented to that effect as to ensure that the public are well informed that it is mandatory for them to pay.

Maintenance / Purchase of equipment: - a lot of maintenance work is needed to be done and equally purchases of some equipment of which if the services they rendered (Board) are adequately paid for will assist the board financially.

Personnel: - the board should recruit more personnel in the department of waste management in order to be able to cope

with the rate at which the waste is being generated and the area of coverage of their activities. In carrying out such recruitment, the board should first carry out job specification and job description, this will enable the board to know the right number and the right personnel to be recruited.

Enforcement of environmental Law: - functional machinery should be set in motion to take care of the proper enforcement of environmental law in the study area. That is, any personnel found violating environmental law should be prosecuted in accordance with the appropriate law.

Hence, public enlightenment should be carried out in form of seminar, workshop, and conference in all three tiers of government. This will educate the public about protection and improve environmental quality.

REFERENCES

1. Abuja Environmental Protection Regulation. 1990
2. Abuja Federal Capital Territory, past, present and future. 1990
3. Agboola, .T. (1988) in Sada and Odemerho (1988) " A review of environment component in Nigeria's national development plans.
4. Anokodare, F.O. "Solid waste management is the Federal Capital collective responsibility". Paper presented at the environment management workshop for policy makers.
5. Bello, Imam .B. (1983) "Administrative frame work. Environmental management in Nigeria with emphasis on refuse collection and disposal" paper presented at a conference on Development and Environment NISER Ibadan.
6. Emmanuel, Samuel (1994) Sanitation wastes Disposal: Nigerian Standard Thursday 7 June. Page 9.
7. Federal Ministry of Environment - library collections.
8. Header, W.P. (Ed. 1979) "Solid waste disposal". The New Book of Knowledge: Gloria Incorporated New York. Vol.1, Page 33
9. Kuje Area Council : Literature review of Kuje and its environs.

10. Sada, P.O. and Odemerho, F.O. (1988) Environmental issues and Management in Nigeria Development : Evans Brothers (Publishers) Ltd. Ibadan. Page 7
11. Tunde, Babalola (1996) Living with waste : Sunday Tribune 2nd May. Page 10.
12. Questionnaire on Environmental Management Strategies on Kuje Area Council - Federal Capital Territory, Abuja.
13. The Guardian, page 9 2002.

APPENDIX
QUESTIONNAIRE

Dear respondent this questionnaire is designed to have knowledge of strategies employed in managing your environment.

Answering the questions in all sincerity will be appreciated

Instruction:

Please tick or comment where necessary

Sex : Male () Female ()

1. Do inspectors inspect your house?

Yes () No ()

2. If yes how often?

a. Weekly() b. Monthly () c. Once a year ()

3. Is there any refuse disposal in your area?

Yes () No ()

4. If No how are wastes disposed?

5. Indicate if your house is using any of the following?

- a. pit latrine ()
- b. public toilets ()
- c. buckets ()
- d. bush ()
- e. trench ()
- f. soak away ()

6. Is your house using pipe borne water?

Yes () No ()

7. How do you obtain your water?

- a. stream ()
- b. ponds ()
- c. rainwater ()
- d. wells ()
- e. bore holes ()
- f. springs ()
- g. dams ()

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- a. pit latrine ()
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