TITLE PAGE

POOR DRAINAGE SYSTEM AND WASTE DISPOSAL IN NYANYA. ENVIRONMENT (FCT)

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A RESEARCH PROJECT SUBMITTED TO FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGER STATE, IN PARTIAL FULFILMENT FOR THE AWARD OF POST-GRADUATE DIPLOMA (PGD) IN ENVIRONMENTAL MANAGEMENT 1999/2000

CERTIFICATION

This Project work has been read and approved as meeting the partial requirement for the award of Post - Graduate diploma (PGD) in Environmental Management of the Federal University of Technology Minna, Niger State.

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DEDICATION

I dedicate this project to the Almighty God.

ACKNOWLEDGEMENT

I thank the Almighty God for seeing me through my studies.

I am very grateful to my husband, Mr. B. H. Dachir for encouraging me to go to school and also for his financial and moral support during the period of my study.

My thanks goes to Dr. P. S. Akinyeye my supervisor, for going through my thesis and giving me all the necessary advise during the course of my research.

My thanks also goes to some of my course mates and friends they were a source of encouragement.

I wish to also than my parents, brothers, sisters, in-laws and friends for their moral support.

I will never forget the peculiar in Christ fellowship International who have always been praying for me as I travelled to and from Minna. To all the people mention above, I pray that God will reward you accordingly.

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CHAPTER ONE

1.1 INTRODUCTION

Most of the developing countries particularly African countries have made great effort in recent years to improve the qualities of their environment. In most cases however, pavement drainage performance still leaves a lot to be desired. It has not been sufficient enough to preserve the quality of the environment in a desired condition.

Engineers, planners and environmentalist have known that storm water accelerates the deterioration and destruction of roads pavements and the entire environment and they have expressed the view that good drainage system is one of the basic needs of our pavement for effective and efficient service. History has shown that delay in the provision of drainage where necessary entails not only expensive reconstruction and rehabilitation but can adversely caused erosion and retards development. (Arnold, 1974).

Providing Urban drainage channel is an important aspect of Urban planning because of its attendant consequences. In Nigeria, flooding and erosion are two drainage problems that are rampart. After heavy rainfall, many roads, residential and non-residential compounds, open spaces are usually flooded as a result of poor drainage facilities.

Furthermore, it does not only block roads but also damage household properties and severe cases loss of lives. Huge quantities of sand are normally deposited on roads causing damages to the asphalt used in road construction, which usually weakens and disintegrates when subjected to

prolonged period of floodwater. It is these destructive elements of rainwater and storm water caused by inadequate and sometimes lack of drainage that triggered of the study.

EROSION:- While flooding is a seasonal problem, erosion produces a rather permanent problem in some locations of Abuja especially Nyanya (FCT), Pleteau, Gombe etc.

Erosion is so severe that the roadways have been worn away and reduced making movement of vehicles difficult. In some areas of Nyanya (FTC) and Enugu, even natural drainage receiving run-off from the urban areas show signs of both erosion and sedimentation. Another aspect of urban erosional problem is the erosion pavement 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 sand (Pickles George 1941).

1.2 THEORETICAL PERSPECTIVE OF DRAINAGE

To effectively treat the issue of drainage problems and effects in many parts of the world, there is the need to know what it entails, its fundamental basis as well as the principles guiding its planning, provision and maintenance. Many professionals accordance to their respective professions have defined the term drainage. One of such agricultural professionals was Arnold who in 1974 defined drainage " as the removal of excess water from the land into a natural channel or into other land".

The term drainage can also be defined as a channel by which liquid is drained or gradually carried off. It can be an artificial conduit or channel for carrying off excess water or removal of water by greying implying either a flow down a slope or percolation.

Arnold also said " drainage is required to carry excess water off the land into a natural channel or artificial channel. In large areas of land, the drainage channels often form a network of ditches into which the surplus water seeps from the surrounding soil. The channel must be made progressively deeper to provide a gradient otherwise the water will not flow and it will not be very effective. In low-lying region, the channel may drain into a stagnant lake or artificial swamp from which the water can periodically be pumped to allow drainage to continue. These channels may be open ditches to an adequate depth with sloping sides and sufficient gradient to permit the water to flow or they may be covered pipes that is closed conduit usually concrete but sometimes plastics into which the excess water can seep and be carried off. This therefore emphasises the significant of width, depth and gradient in the provision of drainage channels for the achievement of efficiency. Drainage can be divided into surface and sub-surface drainage.

SURFACE DRAINAGE

This involves the removal of water from the topsoil. It could also be said that, it is the removal of water from whether rain or melting snow that falls directly on the roadbed and interception and the removal of water coming to the road from houses and adjacent terrain's. This is usually done on soil where sub soil water movement is very slow, while sub-surface drainage involves the removal of water from beneath the soil surface. It involves the removal of water from the sub-surface and with the interception of

underground water coming to the sub-surface. This is accomplished by the use of pipe drains through which the water is removed to a safe distance from the area.

REASON WHY EXCESS WATER NEED TO BE DRAINED FROM THE SOIL INCLUDES:-

1. To prevent water logging: - Water logged soils are usually deficient in oxygen and are usually not advisable for development.
2. It helps in preventing an area from flooding, which always destroy lives and properties.
3. It also helps in controlling the salinity of the soil especially areas where sail water is common.

The process of drainage channel implies the ways of draining water in an urban area. This is mostly concerned with the techniques of draining water in an urban area and the types of drainage channels to suit the type of soil in urban area especially the study area. The common types are:-

PIPE DRAINAGE:- this involves the use of clay plastic prefined in very permeable soils following a relatively wide drain surface.

MOLE DRAINAGE:- This may be used in fairly uniform clay sub-soil, which has stable water. Typical mole drainage has permanent drains laid across the fall. The mole drains are drains roughly at right angles to the permanent drains so as to pass through the gravel. Thus, the grave or permanent black fill (as it is called) will serve to connect the moles to the permanent drains.

DRAINAGE IN DEVELOPED AND DEVELOPING COUNTRIES

As Kate (1962) states that industrialisation and urbanisation in developed countries, storm services and incorporated in urban design to convey surface runoff through the basin to the nearby natural steam channels. Flow augmentation of urban stream has resulted in over bank flow causing severe flood hazards in the flood plains. Excess street storm runoff drains freely into either nearby stream or adjoining on the streets, causing flooding of the roads. This type of problems has been shown to be acute.

URBAN DRAINAGE

Man has shown his creative and innovative mind through his design and construction of Cities which stand as monuments to his imagination, similarly his powerful intellect has enable him evolve solution to the problems facing Cities today.

One of the problems commonly found in the Cities is the flow of storm water through channels/drainage's to receiving water causes. Considerable amount of budgets and time are devoted to the safe conveyance of this water either through sewerage system or in channels and these led to the construction of drainage's of various capacity and discharge.

DRAINAGE IN NIGERIA URBAN CENTRES

The third (3^{rd}) National Development Plan (1975-80) noted that storm water drainage system has not changed for decades, inspite of the called to include drain channels in road construction. It also noted that many of the urban centres lack integrated drainage network. The commonly found drainage systems consist mainly of open earth or roads. This trenches are often

generally too narrow and too shallow to drain the water from the Cities efficiently during heavy rain. Consequently, many streets become flooded and un-motorable. Physical structures such as buildings are also affected in one way or the other. This is the situation in Nyanya town where only few drainage channels have been provided inspite of the high population of people and increasing rate of impervious surfaces due to housing construction.

1.3 STATEMENT OF PROBLEM

The presence of stagnant water in some parts of the, FCT is due to inadequate number of drainage channels. The inadequacy of the existing number of the drainage channels in the study area has led to the presence of stagnant water, places in the satellite town's are usually water logged.

Poor maintenance of the existing number of the drainage channels, despite the fact that the drainage channels are inadequate, the existing ones are poorly maintained.

Poor construction method of the drainage channels due to lack of adherence to engineering specification by contractors usually disintegrates when subjected to prolonged period of floodwater. It is these destructive elements of rainwater and storm water caused by inadequate and sometimes lack of drainage that triggered of the study.

1.4 AIMS AND OBJECTIVES

The aim is to examine the impact of poor drainage system in Nyanya town/FCT with a view to suggesting solutions that will remedy the problems. within this broad aim, the specific objectives are:-

a. To examine the concept of drainage system in the study area.
b. To examine the existing drainage channels in Nyanya town.
c. To identify the problems, effects and causes of poor drainage system on the study area.
d. To suggest physical planning solutions to the problems identified.

1.5 JUSTIFICATION

Nyanya is an area that has high population density. A large percentage of the land is used for development. There is a lot of impervious surfaces with very few drainage channels available. These drainage channels are used for refuse disposal, thereby blocking the channels. Therefore whenever, there is rainfall, the water from the impervious surfaces cannot drain into the natural drainage. The result in flash flooding which covers the roads and causes damage to properties and there is always the presence of stagnant water everywhere in Nyanya. Even during the dry season, water from sewers does not have free passage and the result is water stagnation, which often affects the general well being of the people. Therefore this study is to proffer solution to the impact of poor drainage system on Nyanya environment.

1.6 SCOPE AND LIMITATION

The scope of this study is limited to Nyanya environment. Random sampling will be adopted in the distribution of the questionnaire. The study will concentrate on the problems associated with poor drainage system in the study area. Time constraint will affect the comprehensiveness of the study.

CHAPTER TWO

2.1 STUDY AREA (NYANYA) PART OF THE FEDERAL CAPITAL TERRITORY

The parcel of land demarcated by latitude 8° 25' and 9° 21' north of the equator and longitude 6° 45' and 7° 39' east of the Greenwich Meridian on the world map is Nigeria's Federal Capital Territory. It is geographically placed at the centre of Nigeria. Nyanya, part of the Federal Capital Territory (FCT) was brought into formal existence by the promulgation of decree N0. 6 of 1976. It covers an area of about 8,000 square kilometres, about two and half time the size of Lagos State (3,535 square kilometres, the former capital of Nigeria). The Federal Capital Territory (FCT), is bounded by Niger, Nasarawa and Kogi States from which it was excised.

By virtue of the central location of the FCT within the National context, it is placed entirely in the region often regarded as the middle belt of Nigeria. This belt is a zone of transition between the northern ecological zone with its characteristic grassland vegetation. The FCT therefore shares some of the attributes of the two zones.

2.2 GEOLOGY AND RELIEF

Generally, the FCT can be grouped into three physiographic regions, differentiated by unique assemblages of landforms, underlying geology and elevation. The three regions are Gurara river basin, along western side of the FCT, the jema'a platform from which occupies the central and eastern

portion of the FCT, and Kaduna plains in the extreme north east of the territory.

The area according to Doxiadis Associates (1993) contains complex assemblages of hills, dissected basins, alluvial fans and small isolated plains. Relative relief range from 15 meters to 100 meters with moderate to sleep slopes and generally rough terrain. Absolute elevations range from 150 meters to the west to about 610 meters along the eastern boundary of the FCT. The basement complex rocks underlying most parts of the FCT consist of undifferentiated metamorphic and igneous rocks of pre-Cambrian and lower Palaeozoic ages.

2.3 DRAINAGE

The Gurara River dominates the drainage scene of the FCT. Tributaries to the Gurara River having their origins in the hills around the FCT drain the whole territory with the exception of the Bada plains and the eastern slopes of the Agwai-Karu hills, which form the headwaters of the Koto River, lying outside the FCT.

Generally, seven drainage watersheds are within the FCT. They include the Usuma, Bobo, Afari-Bokwoi, Itsi, Mongoe, Yaru and Topa Rivers. The drainage pattern of the rivers and their tributaries is primarily dendrites although localised rectangular, parallel and trellis patterns could be formed due to joint systems and other structural features of these rivers, the Bobo and Afari-Bokwoi and their tributaries drain the Bobo plains. The tributaries have different local names depending on the village where the flow through.

As far as groundwater resources is concerned, only limited and generalised data are available in the FCT. Nevertheless, it is generally believe that within the basement complex rock underlying most of the FCT, groundwater is stored in the weathered mantle overlying the rock or in systems of joints and fractures in the otherwise solid rock mass. However, two areas the Gwagwa plains and the Agwai-Karu hills have been identified the northern most part of Agwai-Karu hills is considered a potential groundwater source because of the extent of faulting within the underlying metamorphic geologic structure.

2.4 WEATHER AND CLIMATE

The location of the FCT within the Niger Benue trough, on the windward side of the Jos Plateau and at the climate transition belt between the predominantly "humid" south and the "sub humid" north of the country influences to a large extend its weather and climate. In essence, the climate gradients within the territory are from the southwest to the north-east in consonance with the rising elevation from the Gurara valley in the south-west of the Bwari-Aso and the Agwai-Karu hills to the north-east.

The duration of sunshine in the FCT has a range of six to eight hours per day in the south to between eight to ten hours in the north during the period of January to April/May. Usually there is a sharp drop to about a mean of four hours per day in the months of July and August due to increasing cloud cover, while it start to raise again in September when there is decrease in cloud cover.

In case of temperature and humidity, the FCT like other parts of Nigeria records its highest temperatures during the months of the dry season, which

are generally cloudless. During the dry season, the temperature could be as high as 37°c in the south west and about 30°c in the higher northeast. This period is characterised by high diurnal ranges when drops of as high as 17°c may be recorded between the highest and lowest temperatures in a day. During the rainy season, temperature drops considerably due to dense cloud cover. The diurnal range also drops to about 7°c especially between July and August.

With regards to humidity, the FCT records relative humidity in the dry season of some 20 percent in the afternoon at higher elevations and at more at northern location. However, it rises to about 30 percent in the extreme south of the territory close to Niger Benue trough. This rather low relative humidity, coupled with high afternoon temperatures are responsible for the desiccating effect of the dry season, which also mark the presence of the harmattan haze. During the rainy season, the afternoon relative humidity rises everywhere to about 50 percent.

Generally, in Nigeria and particularly the study area the duration and intensity of rainfall decline from the coastland. Two air masses dominate the rainfall patterns, the tropical maritime and the tropical continental. The tropical maritime is formed over the Atlantic Ocean to the south and is therefore warm and moist. It moves inland generally in the southwest to northeast direction. The tropical continental is developed over the Sahara deserts to the north and is therefore warm and dry.

With respect to the FCT, the rains start at about March in the southern most part of the territory to April at the northern limits. The rains end around October in the northern parts of the FCT and about November in the extreme south. Therefore the duration of the rainy season varies from about 240 days in the southern parts to 196 days in the northern parts of the territory.

However, as far as the FCT is concerned these are not the interesting phenomena about the rainfall. The salient points are as a result of the location of the Federal Capital Territory on the windward side of the Jos Plateau means the existence of conditions highly favourable to frequent rainfall. Also, there is a general increase in rainfall total as one moves from the south to the north rather than the conventional decrease in this direction, which is characteristic of the entire country. Two important points arise from this. First, the FCT experience more rainfall than areas on the same or even more southerly latitudes. Second, within the FCT itself, the northern locations generally experience more rainfall than southern ones.

Another note worthy phenomenon of weather in the FCT is the frequent occurrence of disturbance or squall-lines. This is a condition of weather heralded by the occurrence of dense dark cumulo-nimbus clouds with thunder and lighting, followed by strong winds and rainfall of high intensity. Such rainfall may last for up to half an hour and is then followed by drizzle of several hours duration. This weather condition is then replaced by a few days of bright, clear skies. This feature is closely linked with high connective activity aided by relief effect. It is thought to originate from the Jos Plateau region and to travel from east to west across the territory. It is common in the late afternoon at the onset and end of the rainy season and usually causes serious destruction to properties, ripping of roots of building where these are indifferently lacked down.

Other weather phenomenon observable within the FCT is associated with the presence of inselbergs (Isolated hills). These exert; an influence on local weather out of proportion to their size. These inselbergs trigger of

conventional activity leading to intensive orographic rain (relief rain) in their immediate surroundings.

2.5 SOILS

The majority of the soils in the FCT have developed from the crystalline rocks of the basement complex. The soils owe their general form to the physical and chemical constituents of the weathered rocks.

However, local factors such as topography, vegetation type and microclimate conditions determine the site specific morphology of the soil. The soils are generally welled drained except in valley bottoms. Congressional layers occur most frequently and are formed as ferrugnized weathered parent materials. The soils of the plains and hill consist of alluvial complex soil. Generally, the soils of the territory especially those coinciding largely with hilly and rugged landscapes are more sandy than the surrounding soils and are as noted by Ehotiyon Associates (1996) better earmarked for nature protection and outdoor recreation.

2.6 VEGETATION

The FCT vegetation type can be broadly grouped into five plant communities. These are the rain forest, riparian forest, savanna woodlands and shrub savanna.

The rain forest vegetation occupies part of the territory especially along the south-east portion of the Agwai-Karu hill area and around the Bobo plains. It has been postulated that rain forest was widespread around Agwai-Karu hills area base on remnant vegetation and local climatic patterns (Mabogunje, 1977 and LRD, 1979). At present, rain forest in some part of

the territory is generally restricted to three topographic positions. These are the top or foot of rocky hills, steep sided river valleys and broad valley bottoms. These areas correspond to positions for which exploitation of the forest resources for lumbering in Bobo plains, patches of rainforest could still be found in broad river valley including those of rivers Bobo and Afara-Bokwoi and their tributary streams. It is pertinent to note that due to continued and degradation in the territory for development, the normal three layers of trees found in a typical rainforest vegetation has been reduced and some parts totally removed.

The riparian vegetation can be easily identified because of its close proximity to revering water supply. The vegetation type consists of complex of diverse physiognomic and floristic unit; the units contain typical rainforest vegetation as well as woodland and thickets. The forest types consist of two distinct layers of trees and shrubs with the trees sometimes attaining height of up to 25 meters. The vegetation complex is found along the low-level channels of rivers mostly in the western, central and eastern portions of the FCT including those rivers Usuma, Yewu and Bobo.

Savanna woodland are found primarily in hilly terrain such as ridges tops and hills clusters. The upper basins of rivers Bobo and Afara-Bokwoi and Agwai-Karu hills are areas where this type of vegetation predominates. The woodland as found in the Bobo plains is characterised by an over storey of trees forming a light or discontinuous canopy. The trees are found with limited foliage and a ground vegetation dominated by grasses, shrub vegetation is frequently found below high wooded ridge or on low interfluves and therefore of common occurrence. Expectedly, shrubs dominate this type of vegetation with scattered trees.

2.7 LAND USE

One of the major factors, which contribute to the overall quality of the physical environment of any locality within an urban area, is the allocation of land to various land use types. The land use pattern in Nyanya indicates that residential and shopping complex's constituted over 80 percent of the total developed land. This reflects that virtually all-available space in Nyanya is devoted to residential land use. The density of residential dwellings is higher as no space is left between individual building for sewers and drainage channels. This shows that the proportion of land devoted to residential area is excessive when it is realised that ideally only about 50 percent to 60 percent of the developed land in high density residential area of Nigeria Cities should be devoted to residential dwellings. Another serious defect of the land use structure in the area is the small amount of land devoted to transport that is roads and streets. Ideally, high-density residential area to which Nyanya belong should devote between 15 to 20 per cent of land area to streets and roads or for circulation. Mobility within Nyanya is highly restricted.

One implication of the almost complete allocation of developed land in Nyanya is the high population density per hectare. The population density range from 1000 persons to 1,500 persons per hectare. The high densities therefore constitute serious constrains on the available drainage system provided and the maintenance of an acceptable standard of environmental sanitation in these areas.

Agricultural activities in Nyanya are on the low side, as most of the land is devoted to development. Arable Farming is on small scale, because most of the lands have been devoted to residential dwelling. The small river that was

use for fishing has now become a refuse dump. The river is dry as a result of dumping of waste materials into it. Therefore fishing activities cannot be carried out again in the river. There are a few animals in Nyanya, but the animals always go uphill for grazing, even though the little available land is used for both arable farming and grazing.

CHAPTER THREE

3.1 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 Nyanya the study area. All the responses received for the questionnaires will form the basis of the data. Apart from the questionnaire, the ground truth assessment of the study area will add to the information required by the project work.

3.2 SOURCE OF THE DATA

Data are collected from the responses received from people who filled and returned their questionnaire forms and the ground truth assessment made of various places within the study area.

Information was also obtained from library, various textbooks and personal discussions from individuals. Newspapers and other information media were also use as source of data collection.

3.3 POPULATION AND SAMPLING

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

DATA ANALYSIS

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

CHAPTER FOUR

4.1 DISCUSSION OF RESULT

A total of 96 questionnaires were sent out to respondents and 74 completed questionnaires were returned, representing 77% 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

Response	Frequency	Percentage
Pipe Drainage	19	25.6%
Mole Drainage	20	27.0%
Local Drainage	20	47.2%

Of all the drainage system in the study area, local channel constituted the largest. This channel contains mostly waste from pure water, Sobo drinks and other commodities sold in polythene bags. The local channel constitutes about 47% of the total drainage system. This is followed by mole drainage system which are more refine and can only be found in restricted areas. These are the areas that are averagely planned.

Question 2: How do you handle household wastes?

Table 4.2

Response	Frequency	Percentage
By throwing them anywhere	64	86.4%
By storing them in dustbins	10	13.5%

Wastes generated from the study area are largely thrown away into near by drainage system instead of being stored before removal. About 86.4% of the total wastes generated are simply thrown away into drainage/channel. This also indicates that the use of dustbins is not in practice. Only 13.5% 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

Response	Frequency	Percentage
Immediately wastes are dumped	11	14.8%
Not removed at all	10	13.5%
Removed after several weeks	63	85.1%

Table three above indicates that the bulk of the wastes dumped at the various dumping sites or local channel within the study area are abandoned for

several weeks without removal. 85.1% respondent indicated that wastes are abandoned at the dumping sites/local channel for a long time before removal. This indicates that the wastes sometimes block the effective passage of water. This could cause flooding of water, which could lead to damage of properties.

Question 4: When do you observe wastes increases in Nyanya.

Table 4.4

Response	Frequency	Percentage
Rainy Season	57	77%
Dry Season	17	22.9%

Of the whole waste generated within the study area 77% is in the rainy season. This may be due to the additional agricultural wastes that are abundant during the period. There is only about 22% increase in wastes generation during the dry season. Ground-truthing reveals that most of the places in Nyanya during the dry season.

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

Table 4.5

Response	Frequency	Percentage
Poverty	27	36.4%
Ignorance	14	18.9%
Not provided by government	33	44.5%

Majority of people in the study area constituting 44% of respondents have indicated that people do not use dustbin but prefer to dump their wastes into local drainage because they are not provided by the government. This is followed by 36.4% of the respondents who attribute the lack of usage of dustbin to be due to poverty. The remaining 18.9% of the respondents attribute the reason to ignorance. It implies that they are not aware of the damages that can be caused through the blockage of these drainage systems.

Question 6: People can assist in proper channel system management by:-

Table 4.6

Response	Frequency	Percentage
Community effort	25	33.7%
Government to employ labour for cleaning waste from the channel/drainage	49	66.2%

About 66.2% of the respondents have shown that government should employ labour (direct involvement of government) as the best way to help in channel/drainage management. About 33.7% of the respondents however indicate that community effort is the best way to deal with the local

drainage/channel management. This indicates that majority of people will prefer intervention provided by the government.

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

Table 4.7

Response	Frequency	Percentage
Early removal of wastes from channel/drainage system	62	83.7%
Increasing public awareness	12	16.2%

Source compelled by the researcher table 4.7 seven above indicates that about 83% of the respondents in the study area have indicated that government can improve the waste and local channel/drainage management by quick removal of solid wastes from the channel and its environment. This has also shown the level of disturbance heaps of refuse in and around the drainage system to the people in the study areas. The 16.2% response means that people do not see public awareness as important as immediate removal of wastes from within and around the drainage system.

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

Table 4.8

Response	Frequency	Percentage
The use of channels/drainage	00	00%

Burning	10	13.5%
Dumping into the bush	41	55.4%
Dumping within the town	23	31.1%

Source complied by the author.

About 55% of the respondents in table 4.8 above have indicated that dumping the solid wastes inside the bush is the best way to dispose off solid wastes. This is an indication that more people are aware of the dangers of having large heaps of wastes around them. About 31% of the respondents have shown that dumping within town is still the way to improve solid waste disposal while the remaining 13.5% 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

Response	**Frequency**	**Percentage**
Damage of properties	13	17.5%
Offensive smell	25	33.7%
Flooding of the environment	36	48.6%

Source complied by author

In table 4.9, 48.6% 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 flooded channel are uncomfortable due to the muddy and wet ground 33.7% of the respondents are of the view that offensive smell from the dumping sites is more disturbing when wastes are mixed with flooded water. While only 17.5% 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 smoke nuisance?

Table 4.10

Response	Frequency	Percentage
Reduced visibility	12	16.2%
Breathing difficulty	14	18.9%
Eye irritation	48	64.8%

The largest number of respondents constituting 64.8% sees eye irritation to be the most disturbing effects of smoke nuisance from dumping sites. Breathing difficulty comes next with 18.9% of the respondents in support while reduced visibility comes last as the most disturbing effect of smoke nuisance and supported by 16.2% of the respondents.

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

Table 4.11

Response	Frequency	Percentage
Solid wastes falling into drainage		
From dumping sites	9	12.1%
Wind blowing wastes into drainage	19	25.6%
People directly dumping wastes into drainage	46	62.1%

62.1% of the respondents in table 4.11 believed that drainage in Nyanya are blocked by refuse directly thrown into them by the people while 25.6% believed that the wastes in drainage are blown in by the agent of wind. Only 12.1% 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 the blockage of the drainage?

Table 4.12

Response	Frequency	Percentage
Offensive smell	24	32.4%
Flooding of surrounding areas	49	66.2%

Out of 74 respondents in table 4.12, 49 people representing 66.2% consider the effect of the blockage to drainage to be flooding of the surrounding areas

while the remaining 25 people representing 33.7% see offensive smell to be what is likely to happen due to drainage blockage.

4.2 GROUND ASSESSMENT

On the ground assessment, the study indicated that the whole environment had scattered presence of one type of solid waste or the other. There were however limited quantities of wastes in the streets due to the hard work of the Abuja Environmental Protection Board who are always seen sweeping the streets, particularly the main street that runs through Nyanya.

The solid wastes dumping sites are located in some strategic locations in Nyanya 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 has 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 was also little scattered presence of metal and rubber wastes around the channels drainage system.

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 solid wastes from all the dumping sites that are close to drainage channels are threatening to or have completely blocked the

drainage of run off 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 Nyanya, there are areas that are blocked by the solid wastes.

HEALTH RELATED HAZARD:- Environmental degradation may also result from poor storm water management in the urban centres. It is a known fact that many areas that are not well drained serves as suitable grounds for breeding of diseases carrying pathogens some of the present drainage channels are menace to public health and welfare (Jackson M. H et al 1966). The act apart from polluting the air, contribute in the spread of various water born diseases such as typhoid, gastreutorities, amebiasias, arsenic poisoning such fouled water can gain passage to public tap through broken water pipes in drains. Where cleaning 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 pitted 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 Nyanya, 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 deposition on roads causing damages to the asphalt used in road construction, which usually weaken and disintegrates the road when subjected to prolonged period of floodwater. Drainage has been one of the pressing problems in urban areas. In urbanised 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, urbanisation is by far the most hazardous.

Urban drainage problem is a phenomenon, which has got the attention of many environmentalist and government. As Lazarus (1978) said it is generally accepted that the trend towards more intensive urbanisation, which 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 suite complex. This is evident in our urban centres where problems are on the increase with increasing urbanisation. The demand for better study of the growing magnitude of urban drainage problems and the in ability of traditional method of dealing with the problems needs to increase.

CHAPTER FIVE

5.1 FINDING

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 various land lords. This construction terminate at the end of their house building. The fact that industrial growth is still low within the study area, industrial wastes are not yet a disturbing phenomenon. It is however disturbing that dustbins are not in use (see table 4.2) 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 would have minimised the blockage of channels. Apart from the reason given in (table 4.5) 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. This they resulted in dumping their wastes in local channels/drainage system.

The dumping sites within the study area were hygienically in miserable states. 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 of dumping so the refuse is deposited anywhere near the dumping site. In most cases, however, wastes are dump in channels so that the force 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 near dumping sites. Further more, domestic wastes water and rainwater causes offensive smell when they mix with solid wastes.

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 Nyanya where solid wastes have accumulated to the 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 (see table 4.10) into the drainage system.

A very disturbing phenomenon in connection to the dumping sites is the smoke nuisance. Most of the dumping sites are always on fire producing clouds of smoke nuisance into the atmosphere. Apart from the effects of this smoke in climate change it makes the whole environment uncomfortable for living. The smoke causes eye disturbances (see table 4.10), which may lead to more serious eye problems if exposure continues.

Ground-truthing reveals that domestic animals are always found around the dumping sites and drainage channel. Since the life of these animals are related in one way or the other to the life of human beings there is the fear of disease transmission from one type of animal to man. Animals like goats can get poisoned from dumping sites and die. If such a goat is unknowingly eaten it may have some effects on man. Rats are known to transmit disease

known as plague to man. The continuous access to dumping sites and drainage channel by rats therefore poses some danger to man.

Drainage that are constructed to enhance water flow may result in flooding. Several parts of the drainage system are gradually growing weeds whose growth is encouraged by the fertility of the wastes washed into the drainage or deposited into them. If this situation persists in the next few years there may be flooding which may result into lost of properties and sometimes lost of lives.

The irregular collection of wastes and immediate clearance of channels is no doubt contributing to the hopeless situation of the areas. The Federal Capital Development Authority and Abuja Environmental Protection Board lacks adequate equipment for wastes and drainage channel management. There are a few open tipper lorries which, compared with the volumes of refuse generated, are inadequate. Non government organisations like Julius Berger usually assist the Abuja Environmental Protection Board with vehicles whenever a cleaning exercise is conducted at various sites of the study area.

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 a set of laws by their side as a reminder.

5.2 CONCLUSION

It clearly appears that the area council and Abuja Environmental Protection Board have not done enough in terms of the provision of effective and adequate manpower and equipment to deal with the issue of solid wastes and poor drainage/channel system management. The people on their own part appear to be either ignorant of or socially disabled 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 environment in Nyanya.

5.3 RECOMMENDATIONS

The 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 no 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 by farmers 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 size for households to store all the refuse generated. A better and well protected channel should be constructed. A bigger size dustbins should be provided at particular locations to serve a number of household. 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. The government or the solid waste management agency can charge some fees from people who use the dustbins. This will go along way in supplementing the cost of wastes management. This will also avoid the local channel or drainage system from being used as dumping sites for solid wastes.

A strong public awareness campaign regarding the dangers of depositing wastes every where and the advantages of using dustbins should be established and every measure taken to keep it alive for as long as necessary.

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

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