

**IMPACT OF ENVIRONMENTAL HAZARDS ON BUILDING  
CONSTRUCTION PROJECT**

**A CASE STUDY OF LOKOJA – KOGI STATE.**

**BY**

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## CERTIFICATION

This is to certify that this project was carried out and presented by Mary E. Bala Gbogbo of the Department of Geography, Post Graduate school, Federal University of Technology, Minna Niger State.

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## **DECLARATION**

I hereby declare that the thesis has been produced by me. It's topic has not been presented on any previous application for a higher degree. All questions are indicated by quotation marks and sources of information are dully acknowledged through references.

**BALA- GBOGBO, ESUGAYINA MARY.**

## **DEDICATION**

This thesis is dedicated to my beloved sweet mother and my supportive siblings; Deborah, Ernest, Sarah and Elijah Bala Gbogbo..

And to the ever green memory of my dear late father Col. E.A. Bala Gbogbo. May the Almighty God grant him eternal peace. Amen.



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## **ABSTRACT**

Environmental hazards such as flood have great impact on buildings causing havoc and serious damage to the environment and people, particularly in a densely populated area like an urban city environment. This study titled; **“Impact of Environmental Hazards on Building Construction Project”** is specifically geared towards studying the consequences of floods, which accompany rainstorms on the people of Lokoja in Kogi State. Specifically, the emphasis was on the assessment of structural and human losses during such incidents in the context of identifying their remote and immediate causes.

Extensive field observation were supported by questionnaire administration to do on-the-spot assessment and sample residents’ opinions on the phenomenon. Results show that the main causes of flood has been blocked drainages, poor sanitation and severe rainfall and its impact on the maintenance cost, structural stability on buildings is severe. The results also show that diseases like Diarrhea, Typhoid, skin diseases and pneumonia are most prevalent. Losses recorded during flood hazards include those to farmlands, houses, valuables and other unspecified items. Lastly, floods in the study area are yearly occurrences and relief assistance to victims is not quite encouraging.

The research suggests possible solutions to help avoid future frequent occurrence of the menace in our urban environments or to a larger degree, reduce its magnitude.

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### **FIG:1 (KOGI STATE MAP)**

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 BACKGROUND OF THE STUDY**

The quest for National Development as per Jimoh (2000) has no doubt spurred the desire to explore the possibilities of harnessing all available resources to man's advantage. These human endeavors, most often than not, do not give due cognizance to the environment where the entire human process take place.

Consequently, a myriad of environment related problems emerge. In general, the mode of man-environment interactions had been visualized in terms of what can be abstracted from the environment. Anthropogenic activities had therefore contributed to a number of problems whose consequences are severe and multifaceted on the environment.

Construction activities being a contributor in these anthropogenic activities had impacted seriously on the environment albeit negatively.

There is no doubt that construction activities are beneficial to man as in the case of employment opportunities, housing, roads, industries, schools, public buildings, markets and dams. However, to achieve these and yet

many other, the ecosystem must be upset. Trees may be felled, soil harvested and natural habitats of animals disturbed (Makanjuola, 2000).

According to Jimoh (2000), activities constituting anthropogenic are many and varied. This implies that the problems and impacts are equally many and varied. This necessitates the need for a separate or distinct approach to associated problems arising from construction activities.

## **1.2 NEED FOR THE STUDY**

Building construction projects are on the increase due to population growth and Urbanization. Construction of Industries and residential houses with various building materials such as timber woods, Aluminum, zinc, cement, glass, blocks, to mention but few, in there different sizes and specifications to meet desired building design standards of any construction project. All these activities in the building industries with there materials in one way or the other created an impact in our environment, for example falling of trees for timber works, charcoal fire and bush burning called deforestation thereby causing desertification which is leading to environmental hazards like rainstorms, erosion, tornados, pollution etc. causing degradation to our unmediated

environment. Hazard is the broadest terms and reflects a potential treat to humans as well as a impact of an event on Society and the Environment.

The Environment is the central themes of Geography, the global realms includes, the atmosphere, hydrosphere, lithosphere and biosphere. In the atmosphere the problems are air pollution, depletion of ozone layer through discharge of greenhouse gases [GHG], several storms [hurricanes, tornado, typhoon] and blizzards, drought, Hydrosphere includes floods,[river and coastal] avalanches and snow, water pollution, over pumping of groundwater leading to ground water depletion, while lithosphere, we have earthquake, volcanic eruption, soil erosion desertification, forest fire, deforestation mining and land pollution.

Due to environment changes, building construction could be adversely affected, the above mentioned hazards will not only affect life and properties , but the cost of reconstructing building projects, directly or indirectly; prior investigations of environmental impact Assessment officials should be carried out as to the nature of soil, building on dram age lines, coastal areas, the prevailing environmental factors of the particular region, and finally the type of building, it's designs, Among all natural disasters/ hazards, floods produce some of the highest death tolls and material

damage. Floods are caused by a variety of factors not all of which are meteorological; topography and the hydrological capacity of the soil have considerable influence. In many cases, anthropogenic changes to the natural environment such as deforestation building of dams and dikes or strengthening of rivers of aggregate the effects.

Flood is overflows of land although they are adjacent to water are not normally covered by it and hence are used [or usable]. Such over flow cause economic losses or flood damages such as building. Flood is regarded as any relatively high water level of discharge above an arbitrarily selected flood level or flood discharge. Flood could be climacterically included by rainstorm, part climatologically induces by seasonal or episodic melting of ice or snow, also flood not directly, particularly related to particular climate event. Flooding and rainstorm are main environmental hazards that affect building and they are mainly included by precipitation, the seismic waves generated by earthquakes in the sea also cause coastal floods. To solve environmental problems we must look to the future and diatomic how ethical economic and political institutions can contributed to solutions. Protective and evasive action is possible if we have advance knowledge. Following provided building regulation and environmental impact assessment would enhance it.



This work therefore, intended to look more initially into the problems and suggest various control measures and structures to check the resulting effects on people of the area and also the need for an immediate approach to combat the flood problems in the area before the situation gets out of control. As an approach to the problems, investigations shall be made into the nature of the soil in the area, types of building in accordance to building regulations, the socio—economic life of the people the hydrometeorological data and topographical features of the area. Recommendations and control measures to the problems are going to be made using the result of such investigations as parameter of consideration.

### **1.3. STATEMENT OF THE PROBLEM**

Flood which is perenial to most of the areas located near the river banks constitute one of the major problem to the growth and development of Agricultural and Socio-economic infrastructures in those areas such as Lokoja Local Government in Kogi main town. The recession of each flooding is often accompanied by soil erosion and sometimes river banks collapsing diseases and other inimical consequences of the flood to the surrounding area and its inhabitant. Although flooding is not as extensively spread in terms of Local Government coverage, the yearly damage done to structures, properties and farmland of very high magnitude. The Local Government areas bordering River Niger and Benue or the tributances suffer extensive flooding yearly. These Local Government areas are Lokoja, Ibaji, Idah, Kogi, Ajakakuta, Ofu, Igala—mela and Bassa and properties worth millions of Naira are lost yearly. The state has also suffered extensive damage from flash flood after a very heavy downpour and as they often discharges through narrow channels and gorges flash floods are created washing away roads, houses and other public service structures. when the existing hydraulic structures become inadequate to accommodate the sudden change.

#### **1.4. SCOPE AND LIMITATION OF STUDY**

Flooding is caused largely by high intensity rainfall of long duration, dam burst inadequate drainage of low-lying areas, silted channels, urbanization, deforestation, climate change, and other human activities flood incidence has been frequent on different scales across the country leading to loss of lives and properties including buildings and farmlands.

Lokoja, the case study is a relatively small size town of an estimated 56,347 people in the year 2001 spread over a relatively wide area of about 25,539 sq. km. The town is constrained by Mt. Patti {a 400 – meter – high plantain} in the North – West and river Niger to the East. The terrain in Lokoja metropolises and the activities of man towards Urbanization has contributed to the flooding of the town yearly.

#### **1.5. JUSTIFICATION AND SIGNIFICANCE OF STUDY**

This project was focused on the provision of framework on which the environmental impact consequences of flood can be estimated. Scarcity of land and other urban environmental factors have made it necessary for the inhabitant of earth to use the flood prone areas for building construction and Agricultural activities by man. These type of interferences results into floods which lead to the flood plains to become filled up with water

resulting in the destruction of building, farmlands, and roads other infrastructure and the social- economic condition of the inhabitant.

This study will therefore flow on the flooding and economic consequences of the inhabited area of a river to serve as a basis in the palming of flood prone areas. Flood occurs widely in Kogi state. The major casualties, of flood had been homes, whole communicates, farm land, roads, public, building like schools, church, hospitals, market and industrial institution.

#### **1.6. AIM AND OBJECTIVES**

The aim of study is to carry out a feasibility study on flood as an environmental hazard on building projects.

**Some of the objectives of this project are:**

- i. To understand the natural and man made (anthropogenic) reasons of flooding and how it affects building projects
- ii. To educate the people of the area concerning the hazard and impact on building construction projects.
- iii. To identify the extent of such impact on building project
- iv. To recommend ways of ameliorating flood hazard in the area, so as to enhance sustainable urban development.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 ENVIRONMENTAL IMPACTS OF CONSTRUCTION WORKS**

Adibe and Essaghah (1998) define Environmental impact as the net change (good or bad) in man's health and well being (including the well being of the ecosystem on which man's survival depends) that result from environmental effect and is related to the difference between the quality of the environment as it would exist "with" and "without" the same action. They also define environmental effect as a process (such as flood, pollution, erosion, displacement of persons) that is set in motion or accelerated by man's action.

In effect, Adibe and Essaghah (1998) posited that man's action (such as construction activities) have tremendous effect on the environment and its is theses environmental effects that ultimately result in environmental impacts. Raheem (2000) highlights the pre-eminence of the physical environment in the relationship of man and environment. He argues that the effects of man on the environment are ubiquitous, Long lasting and subtle. The reason he gave for importance of physical environment is that, the environment as a whole is a reservoir from which man draws to sustain his economic activities and assure his survival and well being. He adds further that, man

lives in a physical environment, which he often modifies sometimes drastically.

Construction means that it refers to a bundle of activities and an end in itself, seen in this perspective. It manifest in buildings, dwellings, industries, infrastructural facilities, dams irrigations channel, hydroelectric power stations etc. in essence, this way, they relate to the quality of the surrounding environment in terms of pleasantries and the general environmental conditions. These Products in themselves can constitute environmental problems directly or indirectly as caused by man with or without natural occurrences such environmental impacts from these structures normally have a long term impact even though others might be temporal.

Flood which is the environmental hazard being selected in this study and its impact on building construction project does not have universally accepted different. This is because it is viewed differently by different people. For example, flood, is an abnormally high water stage or flow over land, in a stream, flood way lake or coastal area that result in significant detrimental effects on lives and properties. Types of flood includes ocean surge, reverie floods urban flood, flash floods that are short because of cloud burst and floods that result from dam burst. Therefore, floods can be seen as a

situation when a river channel is adequate to accommodate discharge from its catchments however, it can also be regarded as unusually high rate of water discharge which often lead to the inundation of land adjacent to the river. Actually, a river is said to be in floods when it over flows both its natural and artificial banks.

In contemporary time, flooding has become a common feature and part of life in Nigeria not in the low-lying coastal areas such as Lagos, Port Harcourt, and Calabar, Warri, among others but also in the hinter land places like Ondo, Ilori, Kano, Kaduna Bauchi often experiences flood during hairy rainfall events. The rural areas are also not spared from this environmental hazard are homes and farmlands. Building construction project should therefore be taken into consideration and ways it could be constructed to avoid the impact of flooding hazard.

## **2.2 GENERAL CAUSES OF ENVIRONMENTAL HAZARDS ON BUILDING CONSTRUCTION PROJECT. (FLOOD)**

Flood is most frequently related to climate. They are purely an environmental hazard of metrological phenomena but very often induced by mans improper utilization or abuse of the physical environment {Oriola,

1994, 1998}. Excessive heavy and prolonged rainfall is the commonest universal cause of floods {see Olaniran 1983} such rainfall when concentrated produces exceptional local floods. Examples are Ogunpa in Ibadan in 1980 and 1988, Aba at Ilorin in 1976, Lisaluwa and Arogo in Ondo 1988 and 1995, Dolphin and Lekki Estate in Lagos June, July 2004. These events lead to loss of lives and properties mainly buildings were destroyed and left in deteriorating state.

In addition, some Social-Economic and anthropogenic activities have been found to induce or intensify flood conditions in our environment {see Oriola, 1994, 1998}. Among these is Urban Land Use. A large proportion of the urban environment particularly the basis of streams traversing cities is how made impervious by the roofs of buildings, paved surroundings and tarring of roads. The built-up areas have increased in most cities and characteristics by the features stated above. In Ibadan, Nigeria, built-up area increased from 9.5 percent in 1949 to 28.4 per. In 1965, in Ilorin it was 20.9% . In 1981 compared with 9.2% of 1961. Similarly, 28.6% was recorded in 1989 against 13.3% record for Ondo in 1975 [Oriola, 1991]. The study area is not an exception to this phenomenal over growth of structures to the stream / receiving area, which serve as an impediment to smooth passage of water



leading to flood erosion in the area, leading to the collapsing of bridges and some structures in the area. The result of this increase in built up area is greater and earlier concentration of storm water in river and stream channels and a greater high stream flow than would occur under more natural condition. Building and farming activities within the basin also increase sediment yield. This is usually from the exposed slopes bordering the stream and deposited on valley floors reducing the size of the channels

The major effect of Urbanization is the increase in the volume of stream flows which is characteristics of urban environment particularly in Nigerian is poor drainage system along the roads or lacks of proper maintenance of the existing one's or their narrow and insufficient construction. This also induces flood even at the instance of a little down pour of short duration. Intensively rainfall, that run-off rates supercede the infiltration rate of the soil. It may also be due to structural failure, such as dams and mostly, it could be to the use of local and fake building materials that lacks appropriate measurement and specification which any rainstorm would create a severe impact on the building.

### **2.3. CAUSES OF FLOOD IN THE STUDY AREA**

Lokoja is a relatively small-sized town of an estimated 56,347 people in the year 2001 spread over a relatively wide area of about 25:539sq km. The town is constrained by MT. Patti[a 400-metre-plateau] in the North –west and River Niger to the East. Lokoja has a peculiar terrain that makes Land Use inadequate, that development and construction of building on flood plain areas. Buildings are encouraging into the Mt.patti forest where deforestation is on the increase, hereby making rainstorm, and flood more severe on building around the mountain region. The buildings are also built close the river bank violation building and waterway regulations area includes the following:-

- i. Spilling over of the river banks, resulting in flooding due to torrential rainfall, this type of flooding is dermatological in nature, derived from excess precipitation over natural infiltrations. Intense heavy runs accounts for the majority of the floods that occur in the tropical regions and since the project site lies in this region it can also be one of the causes of flood in the area.
- ii. Geological state [nature] of the mountain i.e. of lokoja do not readily stop run-off due to deforestation of the mountain making it bares without vegetation that rise. The level of adjacent level of water the river and consequently spill over to the surrounding farmlands and houses along its

stretch. Most of the early rains run –off the surface without infiltration into soil and causes erosion.

- iii. The rising of the river bed is caused by the duping of solid waste such as animal bones from albacore, domestics waste, industrial waste and crops residues by farms and deposition of salt [sediments], brought about rain water as a result of soil erosion and flow with river water. In the dry season, when the velocity of flow is low {reduced} these materially deposited raises the waterbed level and reduces the discharge capacity of the river. In the wet season, the early torrential rain causes flooding.
- iv. Bank erosion; the tilling of land near the banks, removal of vegetation by local people, overgrazing of the hilly water shed lead to run-off rate and consequently lead to the erosion of the bank.

Lastly, the causes of flooding condition observed during the raining season are due to seasonal rising of ground water table and the existence of clay pans and layers that have excessive fragments of iron concretions at various depths within the profiles of most of the soil identified. Deforestation and denudation which is the removal of forest from the catchments increases the rate of run-off and aids in creating flood conditions.

#### 2.4. COMBATING THE IMPACT OF ENVIRONMENTAL HAZARD ON BUILDING CONSTRUCTION PROJECT {FLOOD}

Buildings makes up man's environment and without it he is homeless besides following proper measurement and specifications there are two feasible measures for combating flood are flood adjustment and flood control, although flood is a natural phenomena. Flood adjustment involves any or combination of the following, accepting the loss, public relief, emergency action, flood proving, structural changes and urban use practices. Emergence action involves the removal of people and properties from the area subject to flood. People remove the properties and evacuate the area due to flooding. Flood fighting steps include building of temporary dykes along the river or outside a building, moving goods and equipment to height unreachable to flood water e.g. upper floors of building and protecting equipment with plastics or water proof sheets or grease.

A structural change is another measure at reducing potential flood losses. Walls are constructed with impervious materials. The building may be underpinned; while windows and other opening at low levels are dashed in some cases building are enacted on hills. There are many instances when people have to sand fills the flood prone area before building is enacted depending on the durability / severity of flood modifications to existing building are possible but on most cases they are incorporated into the

structures Land fills often help in reducing the impact of flooding. This is most effective when understanding before any construction particularly in Industrial or Urban Environment.

Flood proofing involves both emergency action and structural change. It is measure acts that help at repelling floodwater. For example, closure of low-level windows or Sump pumps and elevated outlets pipes to remove water when stepped into basements and interiors of buildings. Houses are built on stilts. This method like other adaptive action, to flood tends to food persistent human occupation of flood plains.

Land Use Regulations, this is a measure involving allocating the flood prone areas to uses that will gain what is lost in floods, for example, agriculture and recreation activities. This is because potential losses tend to vary with the type of use. High losses are expected on Land used for industrial purposes and very low on Land used for recreation or Agriculture. Again, it should be realized that flood losses constitute a cost and it must be considered when calculating the net returns be from Sunland.

A variety of means of regulation flood plain occupation according to Murphy {1958} is states, ordinances, divisional regulations and decreases {in military governance} Government purchases of property and subsidizes

relocation. It is the Governments responsibility to formulate and enforce the regulations. One good thing about land use regulations is that it encourages care full weighing of the costs against the benefits of using the flood plain and offers a valuable complement to other type of adjustment of flood.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 INTRODUCTION**

This chapter describes the research design and procedures used in this study.

The impact of floods in some areas in Kogi State especially Lokoja, which is the case study is prone with river flooding yearly which had devastating effects such as destruction of buildings farmlands and lives.

In the collection of data for this research work, the following methods were adopted. {1} Primary source {2} Secondary source

#### **3.2. PRIMARY SOURCE.**

Primary source refers to such data collection method that relates to Reconnaissance survey, Questionnaires, interview and observation.

##### **3.2.1 Questionnaire**

Series of questions relating to a subject matter are distributed amongst all the target. People of an area, if complete coverage is adopted, or amongst a target people. Of an area, if complete coverage is adopted, or amongst a

target group of the people chosen by random sampling. The distribution may be by post, during personal visits or pasting on their cars and so on .

They may answer the questions and return the forms , or the forms are collected from them- The answer by those who respond normally provide a good measure of desired information that will guide decision making , the questions should from the on set be so formulated that the answer will give relevant information if the results are to be meaningful.

### **3.2.2 Interviews**

Questions, by method, are put to all within the target group for a complete coverage. or to randomly selected persons in a sample survey, and the interviewer records the answers. The questions are such that person being interviewed easily understands that and gives direct answers without being annoyed or embarrassed. As the interaction is face to face, flexibility and adaptability are common and there is always room for clarification of both questions and answers. Where groups of knowledgeable people and experts are engage, the method may prove very useful. The researcher is able in such cases to obtain accurate information. The disadvantages of this means of gathering information are that it is time consuming including difficulties in getting those to be interviewed whey they are required and the possibility of not recording all information given. Use modern electronic recording



equipment such as a tape recorder may be adopted where there are no objections.

### **3.2.3 Observation.**

This is the oldest method in planning survey and entails physical collection of information by the planner. It is a purposeful watching and or counting in a complete coverage survey, of all the people and objects, or randomly specified persons or objects in a sample survey, observation method is necessary and particular useful in land use, transportation and environmental planning, and the use of maps are normally necessary in recording observation. A team of two persons one observing and the other recording in the usual practice. This method is still an essential survey tool, which the researcher employs not only to cross check other method, but also to form a mental picture of the situation.

Firstly, for the purpose of the researcher Reconnaissance survey of the study area was made in order to have a good idea of the happenings and existing situation in the study and to identify and define the scope of the study.

Lokoja town, with wide area of about 25.5390 km<sup>2</sup>. The town is constrained by Mt patti [a 400-metre-high plateau] in the North –west and River Niger to the East. The river flows over the banks during severe raining season and when it goes far beyond the banks it causes revering flooding .

Secondly, questionnaires were administered to general public and Public Officers in order to gather reactions from all these stakeholders' on respective issues intricate to the seemingly dismal level of environmental hazards their possible reason and evaluation of the situation and suggested solution. For the General public / beneficiaries a random sample of 30 respondents using stratification method was made and questionnaires.

Thirdly, interviews were carried out, question by this method are put to all within the target group [stakeholders, general public/ beneficiaries of project and Public Officer of institutions charge with Environmental Management and planning, [Kogi state Environmental Protection Agency [KOSEPA] and Kogi state Town planning and development board,] with carefully selected and stratified random sample 10 officers from these organizations , a total of questionnaires was administered.

Fourthly, observational surveys were carried out on all the identified flood disaster areas for consideration in order to identify or have on the spot assessment of the level of environmental externalities/ impacts of project on the environment and identify mitigation measure in place and their efficacy if any.

### **3.3. SECONDARY SOURCE**

The secondary source of data collection refers to such data from literatures from literatures from relevant books, journals, magazines, papers and unpublished thesis on environmental impact and how it affects building construction projects. Stretches of relevant places and features were made and photographs of places and features were taken for further illustrations.

### **3.4. DATA COLLECTED**

Datas collected from the primary and secondary sources were gathered together and evaluated and analyzed to arrive at a decision; that could later be used to address the issue of flood in building construction projects.

Problems encountered in collecting these datas can not be over emphasized. Getting people (officials) for interview and questionnaires was not an easy task. Financial constraints too, was a problem.

## **CHAPTER FOUR**

### **ANAYSIS AND DISCUSSION OF RESULT**

#### **4.1. FLOOD EXPLAINED**

Some floods are of natural process that results from rainfall and man is unable to control the basic atmospheric process which produced most floods.

The strong seasonality in rainfall over Kogi state is reflected in the flow regime of the river, Niger. The annual river flow like most of its counterpart in the humid tropic is perennial that is flow all the year around with high discharges only during the wet season months.

The implementations of any flood protection project are the result of various pressures. The flood plains adopted by engineers to adjust to the hazard and to achieve one or more goals, it is this goals that helps to determine the method of control measure to be selected.

The goals include:

- a. To reduce flooding
- b. To reduce damages
- c. To save lives
- d. To save properties

it is believed that total eradication of floods is impossible so man, commonly minimize the consequences of such events as they occur to serve one purpose or the other.

The other subjectivity of soils to flooding is influenced by the factors that affect infiltration rates that is permeability and the water retention capacity.

#### **4.2. CAUSES AND EFFECTS OF FLOOD**

Flood menace has caused very serious and unrepeatabe havoc to our environment. Most of the causes of flood in urban cities are due to the activities of man and to some degree from the natural point of view. Below are picture that shows the negative activity of man that help in aggravating flood in urban cities as follows:

This section is based on the information recorded from the sets of questionnaires distributed to both inhabitant of the study area and those residing in the urban city of Lokoja in Kogi state. Other method as said earlier includes visits, documentary evidence and interview were employed to cross check the responses or acquire additional information pertinent to the study. The data collected which includes photographic from the samples have been analyzed and interpreted to support the aim of this research. This chapter is aptly titled analysis and presentation of data.

#### 4.3. PRESENTATION OF DATA

The questionnaire was generally for the study area – Lokoja. About 100 questionnaires were distributed in all. And the breakdown is as follows:-

#### 4.4. QUESTIONNAIRE RESPONSE (PERSONAL DATA)

The questionnaires were categorized into four level of respondent ie. public servant, business man/woman, student and others as follows Kogi Polytechnic staff and students, general public and the members of research area ie. Lokoja

**TABLE 4.1**

UNITS	NUMBER OF QUESTIONNAIRS SENT	NUMBER OF QUESTIONNAIRES RETURNED
Public servant Polytechnic staff, student	100	100
Business	50	40
Man/ woman	50	50
Other general public	100	80
TOTAL	300	270

From the above table two hundred and seventy questionnaires were returned for analysis representing ninety percent (90%) of the whole questions.

#### **4.6 ANALYSIS OF DATA (GENERAL)**

##### **4.6.1 WHAT ARE CAUSES OF FLOOD IN YOUR AREA? AND THEY RESPONDED AS FOLLOWS-**

**TABLE 4.2**

<b>CAUSES</b>	<b>RESPONDENTS</b>	<b>PERCENTAGE</b>
Severe rainfall	60	20%
Blocked drainage	100	40%
Poor town planning	20	6%
Poor building material	10	4%
Poor sanitation (refuse dumping)	80	30%

A close look at the above table shows that 40% and 30% of the respondents accepted the fact that in the urban town poor drainage blocked and poor sanitation (refuse dump respectively in most urban towns causes flood due to blockages of the water channels. And 20% of the respondents believed

that heavy rain storm is the major causes of urban flood. While 6% believe that poor town planning of the town causes flood in the area. While 4% believed that is the use of poor building material are the cause of flood in the area.

#### 4.6.2 WHAT ARE THE IMPACT OF FLOOD TO THE FOLLOWING

**TABLE 4.3**

IMPACTS	RESPONDENTS				PERCENTAGE
	S.A/	A /	Disagree /	S. agr	
Maintenance cost	100	80	50	50	35% strongly agreed
Structural stability	90	80	50	50	30% strongly agreed
Death tolls	40	50	80	100	35% strongly disagree

In table 4.6.2 the respondent attested to the fact that 35% strongly agree that buildings had severe impact during floods. While 30% strongly agree that immediate environment were affected too. But 35% also strongly disagree that death toll was not impacted by flood which means that it was less or there was not record of any.



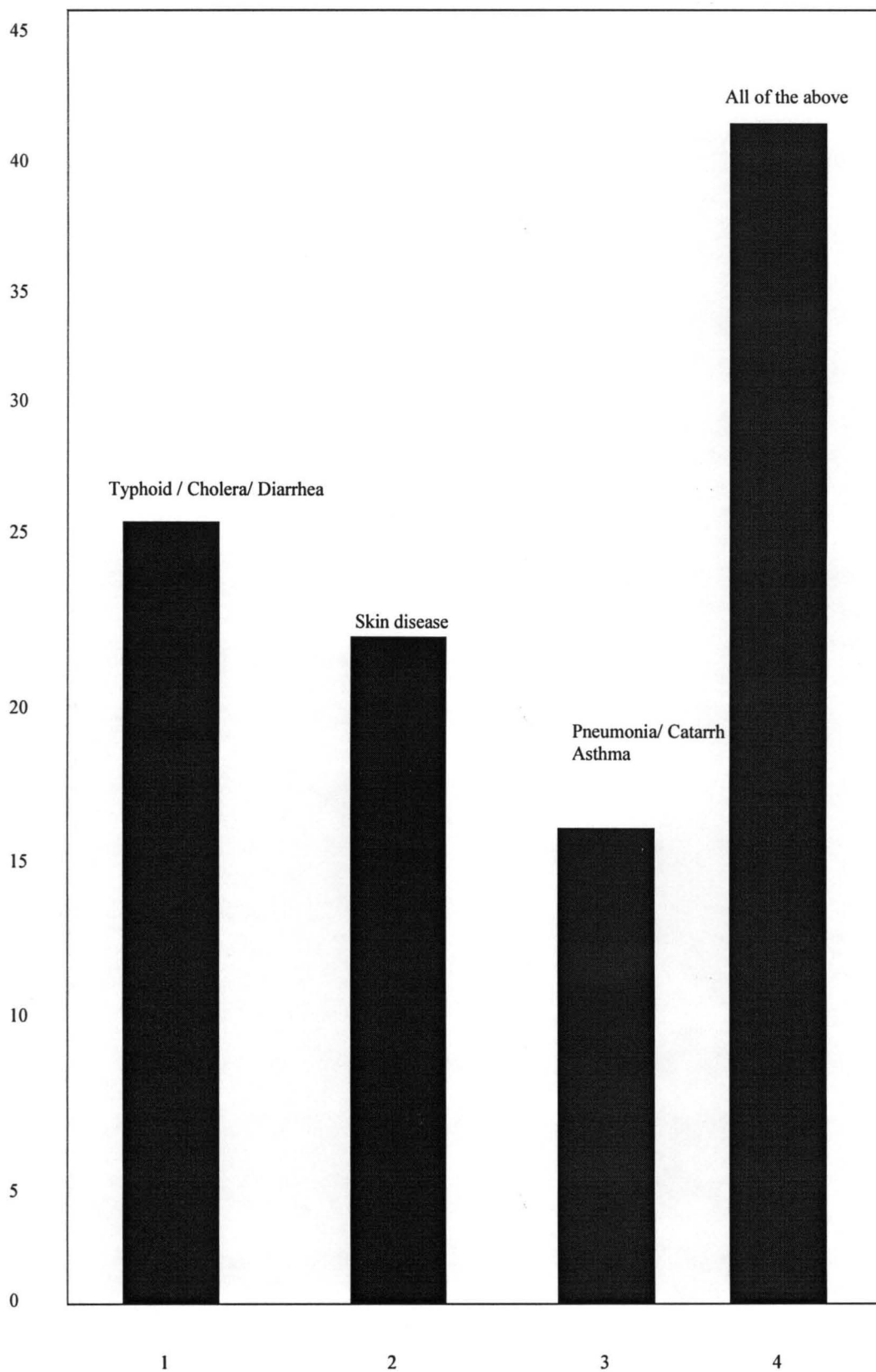
#### 4.6.3 DISEASES CAUSED DURING FLOODING INCLUDE THE FOLLOWING.

**TABLE 4.4**

DISEASES	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	PERCT.
Diarrhea/ cholera/ Typhoid	100	90	40	40	25%  strongly agree
Skin Disease	100	70	50	50	20%  strongly agree
Pneumonia/catarrh/ asthma	90	80	50	150	15%  strongly agree
All of the above	180	60	20	10	40%  strongly agree

The above table shows the degree of responses by those affected during flood event in the area of research. The various percentage show different diseases

Table 4.4 is a histogram representing the type of diseases prevalent during flood disaster in Lokoja.



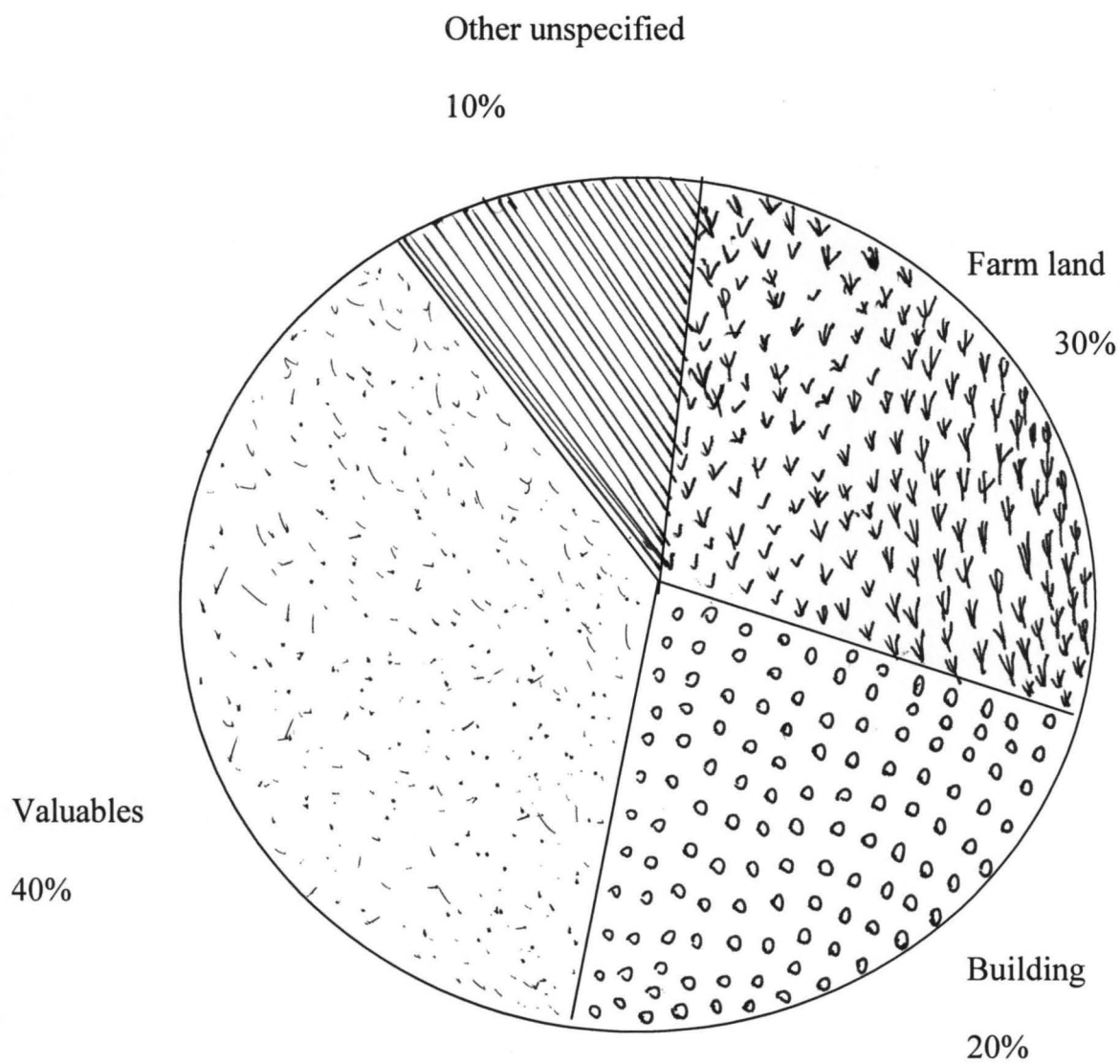
or infliction during the event. Skin disease was high by 20% then catarrh, asthma, high by 15% and typhoid, cholera was high by 25%. All of the above was rated at 40%.

#### 4.6.4.LOSES RECORDED DURING FLOOD HAZARDS

**TABLE 4.5**

LOSES	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	PERCT.
Farm lands/product	120	70	40	40	30%  strongly agree
Houses	100	70	50	50	20%  strongly agree
valuables	150	50	50	20	40%  strongly agree
Other unspecified	90	70	50	60	10%  strongly agree

Table 4.5 show pie chart representing the percentages of the houses, farmlands/ farm products, valuables and unspecified belongings lost during flood menace in Lokoja, Town in Kogi State.



From the table, farmland recorded and valuables affected by the flood; with 20% and 40% respectively buildings and other unspecified which recorded 25% and 10% respectively.

#### **4.6.5 HOW FREQUENT DOES FLOOD OCCUR IN YOUR AREA?**

**TABLE 4.6**

<b>RESPONSE</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
Yearly	200 strongly agree	85%
High /more	50 agree	10%
Occasionally	20 disagree	5%
<b>TOTAL</b>	<b>270</b>	<b>100%</b>

The above table give the total summary of the responds on the degree of occurrence of flood in the various settlement in Lokoja metropolitan town, 85% of the respondent believe that flood use to occur yearly, 10% says is high. 5% believe that it is occasionally.

#### **4.6.6 VICTIMS RECEIVE RELIEF ASSISTANCE AFTER EACH FLOODING EVENT.**

**TABLE 4.7**

<b>RESPONSE</b>	<b>NO. OF RESPONSE</b>	<b>PERCENTAGE</b>
Strongly agree	0	0%
Agree	0	0%
Disagree	70	15%
Strongly disagree	200	85%
Total	270	100%

The above table shows the various responses of the members on the relief amount and the process of disbursement. 85% believe that the relief is not enough and the policy of disbursement is mischievous, 15% also disagree that relief is enough. Therefore door to door disbursement may solve the problem raised by the victims

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1. SUMMARY**

It is not always the best to classify the disaster control measures into before during and after others like the preparedness, prevention and mitigation measures.

Construction is an important component of any Nation's economy and it is noted to be the second consumer of Land after agriculture. This construction activates impacts not only on the environment but is also affected by the environment in which they are carried out.

However, the problems of the environment even though of several dimensions are well known today and are being tackled in a multifaceted way.

Construction phase, being the most critical in the project life cycle, it implies that likely future environmental problems must be anticipated in order to prevent or minimize their effects. This can be successfully carried out through collection of environmental data, management of manpower,

materials, contractors and community relations. But these stages of action can often emerge at one point or the other. The basic idea here is to establish clear and systematic guidelines for action and make actual consideration in coping with flood disasters and how it affects building construction projects. The implementation of these proposals is expected to be carried out jointly by the Federal Government in connection with states, Local Government and International bodies where appropriate.

For its effective constitution a Committee shall be formed encompassing all the specialist the deal with environmental Management. These should include all allied professionals. This Committee aside environmental Management are expected to work out modalities to achieve its successful goals of;

- i. Forecasting flood disaster
- ii. Educating the society ie. Public enlightenment
- iii. Evaluating the victims to save lives and property
- iv. Disbursement of relief materials
- v. Advising the Government

If this is done the negative Social economic impact of flood will be reduced to the barest minimum.



## 5.2. CONCLUSION

This study has utilized climate data to discuss causes and effect, pattern and implication of floods in Lokoja town in Kogi state. Throughout history

floods in different parts of the world had been phenomenal. Lokoja is not an exception. In the past, it was believed that floods occur when the gods are angry. But today we know that floods are mainly caused by climatological, part climatological, structural as well as anthropogenic factors. Efforts are made to proffer ways of ameliorating flood hazards.

The major causes of flooding are high rainfall, expansion of buildup area in the flood plain, human activities in the flood plain, orientation of rivers. Flooding has caused huge losses in property, income beneficial for agriculture.

There is no doubt that construction activities are of immense benefits to mankind as seen by its employment generating opportunities, provision of housing and infrastructural facilities, schools, hospitals, refineries, power plants, water reservoirs, markets, public building etc. however, to achieve all these and yet many others, the ecological balance must be upset as trees

must be felled, soil harvested, natural habitats of animals disturbed and land degraded.

In other words, construction activities despite their impacts, albeit negatively on the environment, cannot be avoided or discontinued. The challenge is to evolve environmentally friendly construction methods, processes and materials in order to cause minimal damage to the environment and less hazards to mankind. This presupposes the need for more realistic modes of environmental focus and concepts.

Environmental impact assessment remains a veritable tool to identifying and quantifying potential impacts of construction projects on the environment. The industrial sector can be encouraged to promote sustainable development.

### **5.3. RECOMMENDATIONS**

Recommendations suggested are two folds. The first is for future and further research while the second is in providing likely solutions to checking the impacts of construction activities on the environment.

In the former, further research is suggested in environmental impacts of specific aspects of construction activities such as housing, highways, tunnels, water reservoirs, industries refineries, exploitation of basic construction materials and products etc.

In most areas that engulfed or embedded by flood, huge sum of money have been expended on different type of engineering measures to reduce flood destruction and to retain flood waters within specified bounds.

Programmes should be involved flood problems rather than making it solely a government responsibility as it is the case today in our society. This can be achieved through public enlightenment over the consequences of floods and prevention techniques. Other effects like provision of refuse dumps to prevent the indiscriminate refuse disposal into water channels or ways, over grazing of land, indiscriminate falling of trees, poor drainage construction, all are issues that need Government and Community attention.

Flood plains Land use regulation should be formulated and enforce to ensure that Land should not be used for development capable of accelerating flooding.

Government should acquire flood plain Land of at least about 45 meters from the river or stream bank to avoid encroachment by developers, thus minimize flood loses. Land users should be discouraged from engaging in

activities that has potentials of increasing run off through the enforcement of Land Use Laws. Establishment of National Environmental Research Institute to carry out researches in all aspects of environmental studies. Stricter penalties and punishment for defaulting developers (clients and contractors) especially as regards EIA.

Finally, Introduction of Environmental Management in Educational curricula of all the professions in the construction industry as a core course ie. Architecture, building, engineering quantity surveying, land surveying, urban and regional planning and estate management.

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**POST GRADUATE DIPLOMA ENVIRONMENTAL MANAGEMENT  
FUT MINNA.**

**QUESTIONAIRES ON PROJECT TOPIC:**

**Impact on Environmental Hazards on Building Construction Project (Case Study, Lokoja Kogi State).**

1. Flood hazards affect your area yearly,  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
2. Flood has a devastating impact on the immediate environment  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
3. The frequency of flood occurrence in your area has affected maintenance cost and structural stability on buildings  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
4. Flood has led to death in your neighborhood  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
5. Flood in your area is caused by severe rainfall  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
6. Flood in your area is caused by blocked drainage  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
7. Flood in your area is caused by poor town planning  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
8. The impact of flood on building is due to use of poor building materials  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
9. Flood is caused by poor sanitation (refuse dumping)  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree



10. The frequency of flood occurrences is higher now than it used to be  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
11. Our drainage channels are not being effectively utilized?  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
12. Victims receive relief assistance after each flooding event?  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
13. Diseases such as Diarrhea /cholera/typhoid are mostly prevalent during flood?  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
14. Diseases such skin infection are prevalent during flood?  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
15. Diseases such as pneumonia/catarrh/asthma are prevalent during flood  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
16. Farmlands/product are lost during any of the flood event around your area  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
17. Houses are lost during any of the flood event around your area  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree
18. Other unspecified valuables are lost during flood hazards in your area  
☐ Strongly agree      ☐ Agree      ☐ Disagree      ☐ Strongly disagree

