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# Assessment of the Factors Influencing the Choice of Indigenous Adaptation Practices to Flood Disasters in Benin Metropolis, Nigeria.

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## Abstract

*Flooding is a global phenomenon that has become a significant concern in many nations, particularly in Nigeria where environmental, socio-economic, and human factor contributes to urban flooding. Many flood disasters are seen in Nigeria's urban centers, the year 2012 flooding hazards that touch all the cities in Nigeria call for effective flood adaptation and the factors influencing the adaptation choice practices. The theory of urban resilience to floods stands as a background in this research that provide for reorganization if there is any destructions. The research assesses the factors influencing the choice of indigenous adaptation practices to flood disasters in Benin metropolis, Nigeria. In addressing flood disasters in the study communities, case study approach, and purposive sampling and in-depth interviews were used to collect and analyses data from the selected flood plain communities in Benin Metropolis. Total of 174 flood affected respondents were interviewed, using semi-structured questionnaires and focus group discussion to collect data from households, fishermen, business owners, institutions. The study gathered that the communities had the knowledge of flooding disasters through personal observation and government and community efforts. The study reviewed that flood zones dwellers in Benin Metropolis are engaged in indigenous adaptation responses such as block-walls revetment, and placing of sandbags, using of sand-walls as flood channeling to the moat, landfilling and constructions of wooden bridges. The study also revealed that the choice of indigenous adaptation response to flood disasters is determined by socio-economic and environmental factors such as Sustenance of Livelihoods, and economic value and benefits of their investments and the available cheap materials for adaptation responses. The study recommended for personal and community efforts in combating flood menaces and the promotion of setbacks in flood zones. The debates on climate change adaptation to hazards and academic frontier will be enhanced.*

**Keywords**: Urban Flooding, Adaptation Strategies, Flood Hazards, Indigenous Adaptation, Benin Metropolis.

## 1.0. Introduction

Flood vulnerability is a global occurrence that is having a significant adverse impact on flood plains settlements, physical, recreational and commercial infrastructure in flood zones (Aderogba, 2012). Flooding is a source of worry in hydrologic and natural hazards science since it ranks first among natural disasters in terms of both the number of persons affected globally and the proportion of people killed individually (Ajibade, et al.., 2013).

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The attraction of flood plains due to its resource and economic potentials has resulted in its conversion for other uses. These include agriculture, commercial, residential and tourism to stimulate economic growth of countries leading to flood disasters which has become a global menace (Cai et al., 2009; McKenzie, 2003).

The global awareness of resilience through research and practice have contributed to the formulation of the Sustainable Development Goal (SDG) 11 and other international conventions and agreements such as the Kyoto Protocol in 1992, the United Nations Convention on Climate Change (UNCCC) and the United Nations Convention Framework on Climate Change (UNFCCC). These policies have highlighted the need for Governments of its member countries to build safe and resilient towns and cities.

The resilience agenda has been the focus of many developing countries. This is as a results of the adverse impacts of climate change, urbanization and unintended urban growth menace (IPCC, 2014; [UNDESA/PD], 2012). Vulnerability to the effects of climate change such as flooding and drought that affects cities and towns globally has engendered a renewed focus in urban planning emphasizing resilience.

Nicholls (2003) opined that researches on adaptation to flood disasters have not focused more on efforts made by institutions and collective community actions and thus, future studies should be refocused on factors influencing the choice of adaptations responses. This gap in flood disasters resilience and management studies has therefore prompted this research which sought to assess the factors influencing the choice of indigenous adaptation practices to flood disasters and what prompted the communities to mobilized resources locally to address flood disaster.

***Scope and Profile of the Study Area***

The scope of the study is selected three local government communities in Benin Metropolis. The study selected Oredo local Government, Egor local Government and Ikpoba-Okha local Government Areas based on the incident of flooding and communities participation in management of flood in all the settlements. The assessment of the factors influencing the choice of indigenous adaptation practices.

The Benin Metropolis is the capital of Edo State; and is location within latitudes 6° I1 and 6° 71 north of the equator and longitudes 5° 4

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and 6° 1 of the east Greenwich Meridian and approximately measures as 13.41 kilometers x 8.4 kilometers (Ministry of Lands and Surveys, 2022).

The Metropolis vegetation is situated within the tropical rainforest region and with heavy rainfall and high temperature and also favourable with high humidity which are naturally good for agriculture. There are various socioeconomic activities going on in Benin metropolis; these include farming of both crops and livestock, trading/market activities. The Benin Metropolis is politically located in seven local government areas which constitute as Benin City; Oredo local government, Egor local government and Ikpoba-Okha local government areas are included.

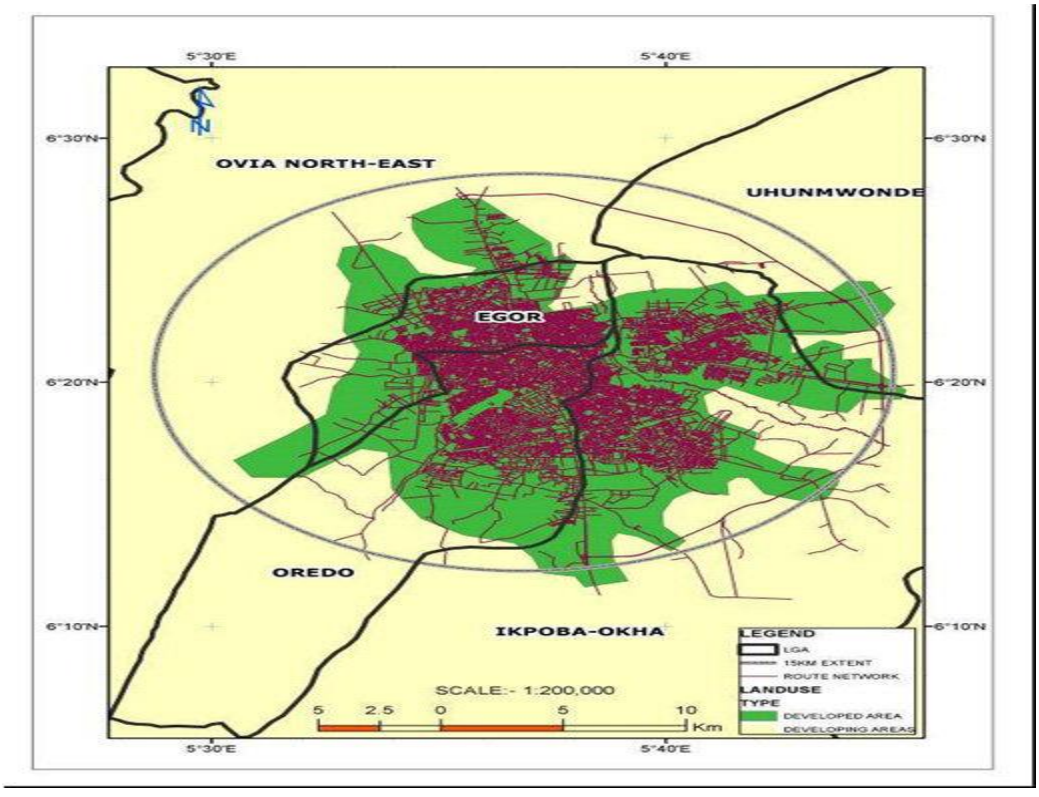



*Fig:1. Benin Metropolis Land Use*

## 2.0. Literature Review

Floods have ravaged most part of the world touching eventually all livelihoods and

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properties. In the year 2010, Pakistan had a flood disaster which the United Nations referred to as the most severe human disturbance and can be accounted as the current event that affected many persons and homes than of the South East Asian Tsunami flood event (Doocy et al., 2013)

In America, the event of floods is yearly and devastation of livelihoods and properties is minimal compare to what other parts of countries in the world are experiencing (UNDP, 2012). The floods that happened between 1-2 of May in 2010 in the middle and West Tennessee, South Central and Western Kentucky and north of Mississippi between devastated the place for many days and caused lots of human deaths (Hallegatte et al., 2013).

### *2.1. Types of Flood*

Three main types of flooding are discussed in this section based on the function the research is here to investigate and the area that is affected, this are;

(i) Urban flooding – This type of flooding takes place where development encroached into stream floodplains or low land that are liable for flooding. In the year 2006, Port Harcourt city had it causes with flooding that submerge buildings, put on holds the city economics activities and displaced the entire communities of Mgbuoba, Diobu and Nkpolu town homeless (Zabbey, 2006). Benin metropolis had it own share in the year 2012 where houses, businesses and land were submerged for some days living houses and others properties destroyed.

(ii) Coastal flooding – It is caused by the surge of storm, waves driving by wind and also downpour of heavy rain (Crawford, Hove and Parry, 2011). The sea water may be pushed up the coastal rivers and inlets due to the surge of storm that overrun it islands barrier, then it will block the downstream flow of inland runoff then causing overflow into built up areas.

(iii) Riverine flooding – is as a result of high rainfall and overflow of water into the stream or river then increasing the water body volumes within its watershed (Lesukat, 2012).

### *2.2. Causes of Flooding*

Flooding can be caused by various factors and it proceeded invariably with heavy down pour. The events of floods occurrences can be suggested being due to anthropogenic or natural factors (Ajayi et al, 2012; Egunjobi, 2006).

#### *2.2.1. Anthropogenic factors*

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According to Adeloye and Rustum (2011) in (Ajayi et al, 2012) stated that the change in climate is not the causes of several events of floods occurrence but anthropogenic factors (man-made). Flood occurred as a result of urban growth, lack of planning laws guiding the building of houses in floods prone areas and also the dilapidated or inadequate drainage ways in the urban or city are the major issues.

Moreover, man has absolute control over man-made causes of floods, such as the disposal of solid waste, drainage clearing and maintenance, and drains for free flow of floods water and to deepen the water bodies' carrying capacities through dredging (African Union and WFP, 2012). Conventional wisdom suggests that man should not live on the flood prone areas or avoid the risks that surrounds with encroachment on flood prone areas. Flood hazards are associated with the undeserved risks people take by encroaching on floods prone areas. Flood disaster will not occur if people stay away from flood prone areas (Ajayi et al, 2012). The activities of human of land degradation, deforestation of floods catchment areas, building of structures on flood prone areas, inadequate drainage infrastructural facilities, residents attitudes on waste disposal are the most relevant factors that aggravates the occurrence of flooding in developing world of resent time Lansigan (2007).

*2.2.2 Uncontrolled Urbanization*

(Ajayi et al, 2012) opined that the uncontrolled urbanization is one of the major causes of flooding in Benin Metropolis in account that some of the houses are erected dry season period which constitutes the river bed.

In accordance to their report, most of the constructed culverts, bridges and other water ways structures are now absolute to carry the present volumes of water being generated through the increases in urban centers activities in Benin Metropolis.

African Union and WFP, (2012) states that, human resilience to flooding can be strengthened if the required measures are implemented. Efficient measures and plans need a suite of collaboration of coping, mitigation and adaptation measures.

### *2.3. An Overview of Flooding Impacts in Benin Metropolis*

The occurrence of flooding in Benin metropolis can be predicted in the sense that its occurs during the rainy periods as seasonal in nature,

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and most especially as flashed flooding, and it happens within the riverine or flood plains areas of the metropolis. The year 2012, the metropolis had a cut of devastating floods disaster hitting all the various parts of the metropolis destroying properties, farm lands and causing disturbances and displacement to thousands of households (NEMA 2012).

Management and coping measures, mostly in the areas flooding, needs to be sustainable built to provide for the current needs both social, economic and environmental and still preserve the phenomenon for future generation (World Health Organization, WHO 2012).

Floods effects is a severe factors hindering Benin metropolis population growth and it urban livelihoods from living above poverty level and a barrier in preventing the UN 2020 several goals in fulfilling imperatives improvement in urban slum dwellers (Action Aid, 2006). Such impacts can be seen in the areas of socio-economic activities (business/industries, infrastructure-dam, bridges, buildings, roads, railways, electricity wire/poles). Flood effects can also be seen the area of farming activities both in livestock's and crops (Aderogba, 2012).

The overview of literatures suggested that Benin metropolis is undergoing severe floods impacts and its livelihoods are passing through severe flood disasters. It does also suggest that the respondents have developed a copy adaptation to cope since they are still living with the flood. This prompted the study to assess the factor responsible for their choice of adaptation to live with the flood.

*Concept of Resilience*

Resilience, as a concept has in the last three decades received enormous global attention and research because of the adverse effects of climate change such as health and environmental, distresses which threaten the survival of towns and cities in both developed and developing countries (Poku-Boansi & Cobbinah, 2018; Merrow et al., 2016). The concerns over the global consequences of climate change amid unprecedented urbanization have reinforced the resilience agenda in several disciplines, including urban planning, agriculture, environmental sciences, natural sciences and engineering (Oladokun et al 2016; WHO 2012).

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However, many researchers and practitioners in urban studies are now embracing the term resilience. While the embracement of the term may be supportive of its relevance, the absence of a universally adopted interpretation is adding to the vagueness and debates as well as the complexity and subjectivity of the term urban (Ajibade, et al., 2013; Campanella, 2006; Lu & Stead, 2013).

Resilience should be seen in the context of being a process of adaptation and continuous functioning rather than an outcome (Sojobi et al. 2015; Chen et al. 2010). This implies that it takes time for cities and communities to build resilience and therefore, the focus should be on building systems that can withstand disturbances over some time (Lau et al. 2010; Onwumere 2013). However, in developing countries like Nigeria, the focus of political elites is mostly on short term outcomes rather than long-term outcomes (Isidore et al. 2012; Adelekan 2010). This perception has been evidenced in some of the knee-jerk solutions to shocks and stresses that confront towns and cities, which has unsustainably failed to address urban challenges (Peate, Wild & Nar 2013; Brown & Murray 2013).

*Concept of Vulnerability*

Vulnerability has been a leading concept in the hazard's perspectives of resilience over the past decade. It provides a robust basis for resilience thinking in planning and urban management. Vulnerability is a key concept in climate-related research. Vulnerability as a term has been touted to have its origin from Geography and the natural hazards studies (Fussel, 2007). Nevertheless, the term has become a basic component of research in various fields of study such as sociology, ecology, natural sciences, anthropology, poverty and economics (Fussel, 2007; Adger, 2006).

This interpretation of vulnerability is helpful in expounding the extent of climate impact and providing inputs like the cost for adaptation or mitigation (O'Brien, et al., 2004). Curtailing outcome vulnerability entails lessening exposure through mitigation or developing adaptations to reduce negative outcomes (O'Brien et al., 2007). Wisner et. al. (2004) identified vulnerability as a starting point by describing it as characteristics of a group or persons and their condition that influence their ability to predict, survive with, resist and recover from the effect of a natural hazard.

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Wisner et al. (2004) opined that vulnerability looks at a blend of factors that determine the extent to which a person's life, property and other valuable assets are put at risk by a distinct and recognizable event in society and nature.

The degree of loss, which is considered as vulnerability, is enhanced by climate change and therefore leaves a precarious state of destruction for cities. Turner et al. (2003) also conceptualized vulnerability as the degree to which a system is expected to experience damage due to exposure to disturbances, shocks and stresses. Shocks and stresses are seen to be hazards that affect the resilience of a system, city or an urban area. These threaten the resilience of systems and cities and therefore increase their vulnerability. Vulnerability is also seen as a very inconsequential constituent of resilience philosophy and has been defined as the tendency of ecological and social systems to suffer damage due to shocks and stresses (Dalziell & McManus 2004; Folke & Carpenter 2000).

**3.0. Methodology**

The method describes the entire framework involved in the gathering of the required data for a study. Asika (1997) opined research as a process to source for information for decision-making. This section unraveled the philosophical basis of the study process assumptions and values which serve as the research rationale. It also revealed the criteria that were used to interpret the data and reaching conclusion.

The possibilities of collecting the required data and answering the primary question for the study, this research embraced the case study where the three case study local governments were critically examined in Benin Metropolis. The cross or multiple case study was used both qualitative and quantitative approaches to collect responses within its specific contexts.
The quantitative method approach was used to collect statistical data and figures on factors influencing choice of adaptation practices of flood disasters in Benin Metropolis to enhance the research. The qualitative parts of the selected method involved in-depth interviews as a way of collecting primary data for qualitative analysis.

The research data were gathered both primary and secondary sources. The secondary data

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were collected from published and unpublished journal articles and reports from Ministries, Nigeria Environmental Management Agency (NEMA) and other stakeholders that are related to the variable of the study.

The primary data were gathered using in-depth interview, focus group discussion and personal observations to collect data from households, business owners, farmers, communities associations, fishermen, youth leaders in the three selected local government areas (which are Oredo, Egor and Ikpoba-Okha local government) to realize the aim of the study. The interview guide comprised of open-ended questions aimed at drawing enquiry about factors influencing the indigenous choice of adaptive strategies to flood disasters.

The interview guide was structured to gather the employment sector, occurrence of flood natural disaster, destruction to properties as a result of climate natural disaster and factors influencing choice of adaptation practices in the three study local government communities.

The sample frame for the study is the 1,230 affected buildings and farm land in the three local government communities. Members of the targeted population were selected randomly to give equal opportunity for every individual the chance of being selected. Two basic techniques of sampling are used in the course of this study.

The Multistage sampling techniques was used to administer questionnaires directly to the affected buildings households, business owners, communities' leader and farmlands. The targeted population was divided into local government delineation, the population sample selection was according to their location characteristics.

**Table: 3.1. Affected Buildings and Farmland According to Local Government**

| The Local Government | Total Number of Affected Buildings | Total Number of Affected Farm Lands | Number of Selected Buildings/Farm Land (50%) |
|---|---|---|---|
| Oredo | 153 | - | 77 |
| Egor | 107 | - | 54 |
| Ikpoba-Okha | 45 | 40 | 43 |
| **Total** | **305** | **40** | **174** |

**Source: Field Work (2022)**

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Each local government area was regrouped according to location of affected buildings and farmlands, and then samples were taken from each. A random sample of households corresponding to 50% of the affected buildings to be interviewed was taken from each of the selected local government areas, making a total of 174 samples representing the target population.

In line with this, a total of 174 questionnaires were designed and administered to the affected respondents accordingly as shown in table 2.1. This set of questionnaires was actually meant to be personally interviewed. In this regard, the respondents were asked questions from the questionnaires and their responses recorded. This is necessary because some of the victims are not educated enough to comprehend the contents of the questionnaire.

Using systematic random sampling technique for the first sample (for the victims), data were drawn from a cross section of 174 households (representing 50% of the sample frame). The method adopted in the selection involved choosing every 3rd building. The heads of the households were sampled but in the absence of such, the elderly people met were interviewed. Table 2.1 gives the breakdown of the affected structures, farmlands and the sample size by Local Government Area.

The accidental sampling techniques were adopted to sample the business owner and farmers. Different category of persons was interviewed randomly without following any regular pattern. However, most of them are adults who were able to give reliable answers. The Focus Group Discussion (FGD) was also prepared for the last sample selection. The communities youth leader, communities associations and others stakeholders were asked about the factors influencing their choice of indigenous adaptation knowledge and practices to flood hazards, opinions and attitudes towards the prevention of flood hazards and effects of the flooding.

The quantitative data gathered from the field were subjected to SPSS statistical tools to achieve aim of the study. The descriptive statistics were used to present quantitative data and other suitable tools for the study.

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Moreover, the semi-structured interviewed guides were used to gather qualitative data from the field and were sorted out in terms of the thematic approach (King & Horrocks, 2010). The qualitative data collected from flood plains dwellers in the study areas communities were captured and reorganized into themes relevant to the aim of the research. The qualitative data presentation made use of content analysis, quotes and analytical references tools aimed at linking them to the study objective.

## 4.0. Results and Discussions

Following from the methodological framework for analysing factors influence the choice of indigenous adaptation responses to flood disasters by flood plains dwellers in the previous sections, this section presents findings from the semi-structured in-depth interviews and focus group discussions with selected flood plains dwellers, households, business owners, institutions, stakeholders, communities leaders as well as direct observations made in the three case study communities. The results as presented in this sections answer the factors influence the choice of indigenous adaptation responses to flood disasters by flood plains dwellers.

### 4.1. Employment Sector

**Table 4.1: Employment Status by Case Study Local Government Areas**

| Employment Status | Oredo Local Government Area | | Egor Local Government Area | | Ikpoba-Okha Local Government Area | | All Communities | |
|---|---|---|---|---|---|---|---|---|
| | Number of Interviewees | Percent (%) | Number of Interviewees | Percent (%) | Number of Interviewees | Percent (%) | Number of Interviewees | Percent (%) |
| Employed | 69 | 90 | 50 | 93 | 43 | 100 | 162 | 93 |
| Unemployed | 8 | 10 | 4 | 7 | - | - | 12 | 7 |
| **Total** | **77** | **100** | **54** | **100** | **43** | **100.0** | **174** | **100** |

**Source: Field Survey, June 2022.**

Results from the field studies revealed that flood plain dwellers are mostly employed in the agricultural, commerce, service and the industrial sector in all the three case study local government areas as can be seen in Table 4.1.

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From the Table, 93% (162 out of the 174) interviewees in all the study three local government areas were employed while the remaining 7% (12 out of 174) interviewees were unemployed. From the proportion of the interviewees that were gainfully employed in the study areas (according to Table 4.1), according to Evasriste et. al. (2017), opined that business owners increases their sensitivity on climate-related disasters and its accessibility impacts. This shows that employees have the potentials in building resilience to protect their properties against flood disasters. It also reviewed from the table that their state of employment was the factor they considered in building resilience to protect their properties against flood disasters.

**4.2. Destruction to Properties as a Result of Climate Natural Disaster**

**Table 4.2: Damage to Properties by Case Study Local Government Communities**

| **Type of Property** | **Oredo Local Government Area** | | **Egor Local Government Area** | | **Ikpoba-Okha Local Government Area** | | **All Communities** | |
|---|---|---|---|---|---|---|---|---|
| | Number of Interviewees | Percent (%) | Number of Interviewees | Percent (%) | Number of Interviewees | Percent (%) | Number of Interviewees | Percent (%) |
| Building | 19 | 25 | 13 | 24 | 8 | 19 | 40 | 23 |
| Shops | 25 | 32.4 | 15 | 28 | 6 | 14 | 46 | 26.4 |
| Market Goods | 21 | 27.2 | 14 | 26 | 9 | 21 | 44 | 25.2 |
| Electronic equipment | 5 | 6.4 | 3 | 6 | 1 | 2 | 9 | 5 |
| Fish Pond | 6 | 8 | 5 | 9 | 8 | 19 | 19 | 11 |
| Farm Plantation | 1 | 1 | 3 | 6 | 9 | 21 | 13 | 7.4 |
| Rubber Industry | - | - | 1 | 1 | 2 | 4 | 3 | 2 |
| **Total** | **77** | **100** | **54** | **100** | **43** | **100** | **174** | **100** |

**Source: Field Survey, June 2022**

Interviewees were asked if they had experienced destruction of their properties due to the events of flood disaster. Finding answer to this question was essential as respondents' exposure to certain climate-related natural disasters and the damage caused to properties affects the approach adopted in addressing flooding.

Finding from the field investigation reviewed that destruction to properties as a result of flood

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disasters had been observed in all the case study local government areas communities. In all the three study local government areas communities, 100% (174 out of 174) of the interviewees stated that they experienced destruction to their properties due to disasters in the last 10years (see Table 4.2). The low-lying relief and topography of the three case local government areas communities makes it more susceptible to flooding.

This account for the high percentage of respondents in all three case local government areas communities who are experiencing destruction of properties as a result of flood disaster. The Ikpoba-Okha local government areas that is lying along the Ikpoba-River is also experiencing high flooding due to the river surge. As reported in Table 4.2, properties such as buildings, shops, market goods, electronic equipment, fish ponds, farm plantation and rubber industries have all been destroyed as a result of the flood disasters in the study communities.

In Egor local government areas for example, 24% and 28% of the respondents reviewed that their buildings and shops had been damaged as a result of flooding which was induced by high rainfall. In Oredo and Ikpoba-Okha local government areas, 25% and 21% of the respondents indicated that their buildings and farm plantation had been damaged (see Table 4.2 for details). This increases their sensitivity thereby making them vulnerable to climate change.

As reported by a interviewee in Ikpoba-Okha local government area, residents are now vulnerable during flood disasters as belongings including buildings are destroyed: *"It was a disaster about 5 years ago. My grandmother's house was washed away by flood. We were there watching as the flood was washing away the whole building down. Other buildings were also destructed by the flood. We all have to look for a friend place to stay for some time before getting another accommodation. It was a sad period for most of us in this community"* ***(Respondent 1, Ikpoba-Okha local government area, June 2022*)**.

From the report of the interviewee, it can be deduced that disasters such as flooding have been destroying properties along flood plain areas and that, those affected are unable to do

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anything other than observe the destructions of their properties. In addition to buildings, some respondents have also experienced the destruction of religious deities such as shrines, which are re-instore by most of the local government areas visited in Benin metropolis. As asserted by a respondent in Egor local government area: "*There was a shrine post about few meters from here which everyone in the community worship. It has gradually washed away by the flood over the years, as a result of heavy rainfall causing flooding.*" ***(Respondent 2, Egor local government area, June 2022).***

Results gathered from the respondents also shows that the shops of some of the interviewees in Oredo local government area had also been destroyed. This was asserted by a respondent in Oredo local government area who said that: "*It is very difficult to find a good shop to rent in this area because of the situation of flooding. The few shops that are available are been submerge by water or washed away by the floods. My shop with market goods was submerged by flood and everything destroyed. As you can see, all the shops are rendered useless now*" ***(Respondent 3, Oredo local government area, June 2022)***.

**Table 4.4. Factors Influencing the Choice of Indigenous Adaptation Practices**

| Factors Influencing Choice | Oredo Local Government Area | | Egor Local Government Area | | Ikpoba-Okha Local Government Area | | All Communities | |
|---|---|---|---|---|---|---|---|---|
| | Number of Interviewees | Percent (%) | Number of Interviewees | Percent (%) | Number of Interviewees | Percent (%) | Number of Interviewees | Percent (%) |
| Sustenance of Livelihoods | 20 | 26 | 15 | 28 | 11 | 26 | 46 | 26 |
| Investments | 10 | 13 | 9 | 17 | 7 | 16 | 26 | 15 |
| Economic Value and Benefits | 15 | 19 | 11 | 20 | 10 | 23 | 36 | 21 |
| Cheap Materials | 23 | 30 | 14 | 26 | 12 | 28 | 49 | 28 |
| No Adaptation | 9 | 12 | 5 | 9 | 3 | 7 | 17 | 10 |
| **Total** | **77** | **100** | **54** | **100** | **43** | **100** | **174** | **100** |

**Source: Field Survey, June 2022**

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Fig. 1.2. Adaptation Materials (Source: Field Survey, 2022)

In answering the objective of the study, assessed the factors that influence the choice of indigenous adaptation practices interviewees in all case study communities. Factors influencing the choice of indigenous adaptation responses by flood plains dwellers are limited in literature when it comes to flood disasters and climate change adaptation studies. The study revealed that various factors influence the choice of indigenous adaptation response by flood plains dwellers in all the case study communities.

For instance, 26%(46 out of 174) of the three case local government areas interviewees revealed that sustenance of livelihoods and investments was a factor that influence flood plains dwellers who engaged in block-wall revetments, land filling and constructions of waterways as an indigenous adaptation response to flood disasters. This is because a majority of the interviewees who use block-wall revetments engage in commercial activities along the flood plains. These include shops, rubber industries, fish ponds, electrical stores and other

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commercial facilities. The study found that their livelihoods depend on these commercial activities and so they have to engage in hard structural defences such as block-wall revetments, land filling and constructions of waterways even though they are expensive.

The study further revealed that 21%(36 out of 174) of the interviewees stated that economic value and benefit is another factor influencing indigenous adaptation responses to flood disasters in all the case study communities. Flood plains dwellers who used tree planting such as the planting of plantain crops, orange tree, mango trees are motivated by the economic benefits of the trees through the selling of the fruits and also its adaptation mechanism in preventing the inundation of the river and flood against their properties in response to flood disasters. The study identified 28%(49 out of 174) of the interviewees revealed that the availability of ready and cheap materials for adaptation as another factor influencing the choice of indigenous adaptation response to flood disasters in all the case study communities. The research found that the availability and cheap nature of sand for sandbags, sand for sand for sand wall revetment and old car tyres for tyres placement in the community motivates flood plains dwellers undertake them as indigenous adaptation practices to flood disasters.

Thus, flood plains dwellers considered these indigenous practices as reasonable and less expensive as compared to the other hard structural defence adaptation options such as block-walls.

**5.0 Conclusion**

Flood disaster has social, environmental and economic impacts on flood plains dwellers in all case study communities. It was revealed from the discussions that flood plains dwellers no matter the severity of flood disaster are engaged in indigenous adaptation practices to curtail flood disaster and its associated impacts.

The study also revealed that flood plains dwellers have several factors that influence their choice of adaptation practices which varies from flood plains dwellers with buildings and those with commercial properties along the flood plains of all three case study communities. Flood plains dwellers with buildings, shops and commercial activities adopted the block-wall revetments, waterways construction and land

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filling as a way of protecting their investments because of their efficiency and effectiveness in addressing flood disasters and the sustenance of livelihood and investments. Flood plains dwellers with buildings in the three case study communities that are engaged in the temporary coping measures to flood disasters are motivated by the availability of cheap materials for adaptation and to safeguard life and property. However, it was found in the discussion that some of the building owners along the flood plains were not engaged in any indigenous adaptation practices because they believe it is a natural phenomenon that one could not do anything about, the unavailability of resources for adaptation and the lack of security of tenure.

The study revealed that the flood plains dwellers are motivated to curtail the flood disasters against their properties because of their livelihoods along the flood plains. Individuals are engaged and motivated to practice adaptation because of economic, social and livelihoods survival gains.

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