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Addressing Environmental Management through Flood Assessment Based on Institutional and Capacity Building Efforts in Lokoja Metropolis of Kogi State, Nigeria.

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ABSTRACT
Flooding has been a major environmental and urban management problem in most of the cities found in Nigeria, especially in the Lokoja metropolis of Kogi State, which is found in the area of the confluence of the Niger and the Benue rivers. This paper analyses the management of floods in the region by looking at the opportunities presented by the environment, institutional setup and capacity building at the individual, household and institutional levels. The mixed-method approach was chosen. The primary data were collected by means of questionnaires that were conducted among 400 participants and field observations; the secondary data were collected using the pertinent literature sources, government publications, and institutional reports. The analysis of the data was performed using descriptive statistics such as frequency counts, percentages, tables, Likert scale analysis and Relative Importance Index. It has been found out that the human activities that contribute greatly to the flooding in Lokoja are unchecked urban growth, settlements, and poor drainage systems. The secondary contributing factor was identified to be heavy rain. The research also indicates that household and individual preparedness is minimal. Flood preparedness activities are rarely practised by many residents, and awareness, insurance cover, and emergency planning are still poor. Government agencies and disaster management authorities at the institutional level portray poor capacity-building mechanisms. Their activities are not well coordinated, under-financed and limited by a lack of active planning and enforcement of the environmental regulations. Such failures enhance the susceptibility of people to recurrent flooding, which causes disturbances in livelihoods, economic operations, population health, and social stability. The paper hence emphasizes on the need to have integrated flood management practices that reinforce institutional structures, enhance urban planning culture, create awareness among communities, and reinforce capacity-building activities. These are critical towards enhancing the disaster preparedness and sustainable environmental management of the flood-prone urban centres.

Keywords:
Flood Management,
Institutional Capacity,
Disaster Preparedness,
Lokoja Metropolis

INTRODUCTION

Floods refer to the overflow of the normal boundaries of a stream or other water bodies or the build-up of water that is not normally submerged in areas (Glago, 2021). Floods can be categorized as a disaster that leads to the destruction of human lives, properties and the environment in that year and at various locations around the globe with different magnitudes (International Federation of Red Cross and Red Crescent Societies, 2021). For example, the natural causes of floods include excess rainfall, soil topography and nature. Also, poor housing, environmental planning/monitoring, construction projects in flood-prone areas, deforestation, and random successions, which lead to the obstruction of sewage, unhealthy waste disposal, government negligence in designing and applying policies on multiple levels, as well as unhealthy environmental planning and ineffective policy implementation, promote flood occurrence (Mfon *et al.*, 2022). The phenomenal flooding that took place in summer 2005, a result of Hurricane Katrina that brought about over 108 billion in damages, is part of the most expensive natural disasters in the history of the U.S. (Satterthwaite, 2012; Blake *et al*., 2011).

Urban floods and environmental challenges are linked. Floods may bring about environmental issues and pose

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risks in case care is not taken to reduce the proliferation of pollution as a result of flooding (World Meteorological Organization, 2006). Oriaku's (2025) findings indicate that the impact of urban flooding is devastating ecologically, particularly in terms of water source pollution (47.5%), massive soil erosion (40%), and disturbance of the ecosystem (42.5%). The threat to public health is also significant, and high rates of waterborne (45) and vector-borne disease (50) are reported, along with high levels of mental health consequences (42.5%).

The impact of climate change, urbanization and land-use alterations on flooding is pervasive. River basins around the world have also been studied to explore the impact of climate change on the river flow regime (Deng *et al.*, 2025; Lewis *et al.*, 2023; Ranjan *et al.*, 2025). The rise in the intensity and frequency of the hydro-meteorological events is also caused by climate change, which preconditions the aggravation of flood event occurrence in numerous areas (AlZaatiti *et al.*, 2025; Hettiarachchi *et al.*, 2018). Due to this risk of flood caused by the shifting patterns of precipitation, it is vital that the effects of climate change are included in the flood risk evaluation of local communities.

The impacts of disasters on developing countries are much greater than those that are experienced in more affluent countries, even when they are exposed to the same hazards. Low- and middle-income countries are three times more likely to suffer economic losses due to natural disasters, as a percentage of GDP, in comparison to high-income countries (Shiksha, 2025). This weakness is caused by interrelated aspects. Impoverished populations tend to live in areas which are prone to risk, as flood plains, steep hillsides, or coastal regions, where the land is cheap, yet most affected areas are prone to the risks. Dense informal settlements occupy the riverbanks of Mumbai, offering the residents a livelihood but at the cost of being repeatedly exposed to floods and storm surges (Shiksha, 2025). Among the 170 million of high risk of floods and extreme poverty (living below 1.90 per day), 44 per cent are in Sub-Saharan Africa. More than 780 million of the population who survive on less than fifty-five dollars daily are at risk of high floods (European Commission, 2022). More so, most cities are highly vulnerable to the dangers of flash floodings, as they have a high concentration of both personal and municipal infrastructures, which leads to vast areas of impervious landscapes and, in some cases, improper drainage systems (Martín-Raya *et al.*, 2024; European Commission, 2022). In order to empower the city populations that are vulnerable to climate change large scale programmes were undertaken on the drainage structures and national contingency plans. Nevertheless, the majority of those efforts applied a top-down method and were not adjusted to the local environment due to lack of involvement of the involved stakeholders (Vertigans & Gibson, 2019). These programmes therefore did not succeed due to the mis-calculation of adaptation measures of local stakeholders, and insufficient ability to sustain the huge infrastructures in the long-term (Bottazzi *et al.*, 2019).

The Nigeria Hydrological Services Agency (2020), during its annual flood outlook, defines the key causes of flooding in Nigeria as follows: soil moisture, extreme weather conditions due to change of climate, the operation of dams, especially those near the borders of the country and topography. Adegboyega *et al*. (2018) indicate that a cause of urban flooding is land use changes, which include urbanisation. Echendu (2021) observed anthropogenic factors as the primary contributors of flooding in Nigeria and Ghana, which aggravate the impact of heavy rainfall, but the impacts can be reduced through risk-management measures and infrastructure planning. Watchers News (2025)also exposed the Causes of flooding in Nigeria include the release of water in the Jebba Hydroelectric Power Station dam, which resulted in at least six floods claiming at least thirteen lives.

The high intensity of rainfall in major cities in Nigeria is causing severe flooding, which has led to massive displacement and loss of life (Ichite & Yusuf, 2022). Umar and Gray (2022) observed that the North-West zone was recorded as having the largest number of floods, with 31 cases, followed by the North-Central and North-East areas of Nigeria were recorded 20 and 19 cases, respectively. The South-East zone was the zone with the least floods, just like the South-South and South-West zones. It is evident that during most years, the dominance of flooding in the northern parts prevails. In Nigeria, floods in 2012 impacted 7.7 million people and displaced 2.1 million people. In 2022, 4.4 million individuals were displaced, with 2.4 million people being affected. The total number of displaced individuals was 641,598 people, 285 killed, 2,504 wounded, 127,544 hectares of farmland destroyed, and 8,780 animals lost (BudgIT, 2025). In April 2025, (Reuters, 2026) a string of flooding events took place, leading to the destruction of property, loss of lives, injuries and displacement in Nigeria. The largest flood to date was the 2025 Mokwa flood in May, which claimed the lives of at least 500 people.

The effect of flooding in Nigeria may be positive or negative. Olonininran (2022) cited the effects of flooding as being the unavailability of food supply in the flood-affected regions and in other regions whose economies relied on products produced by those regions. The farmlands were swept away during flooding, and food banks located at the homes of residents or warehouses were also swept or washed away by the flooding. In his opinion, Echendu (2021) viewed that flooding adversely impacted the economy, health, social life and environment. Flooding represented a menace to Nigeria in meeting the global sustainable development objectives.

Flooding in Nigeria greatly affected the development objectives of this country in terms of social, economic and environmental objectives. Although the side effects of flooding are detrimental, the benefits are also many. Indicatively, the 2022 flood foiled the ill-known operations of terrorists and robbers in certain States in Nigeria. In his observations, Israel (2022) pointed out that Jigawa, Kaduna and Niger States had been the incubators of terrorism ahead of the 2022 flood. The activities of these terrorists in their environment have been hampered by the flood. Overnight, the kidnappers had no knowledge of their terrain. Results of the Hassan *et al*., (2023) research indicate that the respondents concurred that people should be shifted to higher heights as the best remedy to curb the effects of floods, and other respondents concurred that an alternative remedy is to construct and repair new drainages.

The study area focuses on Lokoja Metropolis, the capital city of Kogi state, Nigeria. It is at the meeting point of the Niger and the Benue rivers and the capital city of Kogi State (Encyclopædia Britannica, n.d.). Research has revealed that besides the trend of extreme events that are characterised by intense rainfalls and rise in temperature, it is the peculiar position of Lokoja directly at the confluence between the perennial Niger and Benue rivers that contributes most to the occurrence of floods (Odunuga *et al.,* 2015; Buba *et al*., 2021). In the last ten years, the intensity of these floods has increased, causing the death of over 250 individuals and the displacement of at least 18,500 people (Nche, 2024). In September 2019, over 150 communities in the state were hit by floods (Adaoyichie, 2019). The latest flood in 2022 has affected nine local governments along the river Niger and Benue (Lokoja, Kogi-Koto, Ajaokuta, Ofu, Igalamela-Odolu, Bassa, Idah, Ibaji and Omala) (Onyedinefu, 2022).

Flooding has affected the Lokoja metropolis ecologically, socially, economically and health-wise. According to (Buba *et al.,* 2021; Osayomi *et al.,* 2022), the consequences of the floods have resulted in massive destruction of sources of livelihood, including homes, businesses, valuable papers, water sources, roads and healthcare centres worth millions of USD. Farm produce was also destroyed by the floods, and the remaining crop could not be harvested (Oyedele *et al*., 2022), resulting in food shortage, increased food prices, and major loss of revenue by farmers and the state (Danjibo *et al.,* 2019). Such floods have drastic economic effects that affect the businesses and agriculture in the area (Roy *et al.,* 2022), and leave many families languishing in poverty (Hallegatte *et al.,* 2020). On the same note, Emmanuel *et al*., (2024) find that the 2022 flood has a negative and statistically significant impact on business activities. There was low business patronage and a high cost of goods during the flood period. In addition, the findings indicate that the small businesses were also largely impacted during the flood period compared to large businesses. Socially, the majority of the residents and their families are left as the social wrecks because they have to deal with the effects of the flooding that include homelessness, to camps, where they may fall prey to snake bites, cholera, hepatitis, typhoid fever, malaria, and other water and vector-borne illnesses (Buba *et al.,* 2021; Emmanuel *et al*., 2024).

Mitigation and adaptation to flooding are concerned with institutional and capacity. In disaster management, capacity is the aggregation of all strengths, attributes, and assets in a community, society or an organization that can be utilized to minimize risk of disasters and manage the negative effects (Public Administration Institute, 2024). Disaster capacity refers to the capacity of the community to survive and rebuild in disaster situations, whether they are physical, social, or economic. Physical capacity consists of infrastructure, equipment and tech; social capacity consists of community ties and collective action and economic capacity is financial resources and resiliency. The combination of these factors dictates the effectiveness of a community to react and recover effectively in case of a crisis, such as the flood situation in Nigeria (Public Administration Institute, 2024). The necessity of DRM capacity building is determined in the global frameworks, such as the Sendai Framework of Disaster Risk Reduction (2015-2030), as an essential issue at the governance levels, both national and local (Kovalevski, 2025).

Nigeria has a number of disaster management agencies, including the National Disaster Management Agency (NEMA), the Nigeria Police, the Federal Road Safety Corps, the Nigerian Fire Service, the National Security and Civil Defence Corps, among others. However, the degree to which these agencies' various efforts are harmonised, coordinated, and synchronized during emergencies leaves much to be desired (Mohammed, 2023). Among the main functions of the local authorities, like the NEMA, is the identification of the regions prone to floods. This may be performed by mapping and modelling (National Emergency Management Agency, 2023). The World Health Organisation is of the opinion that every nation ought to have in its possession a working vital registry system in order to offer the most reliable data on the key events. The emergency management in Nigeria is characterized by a number of difficulties, such as inadequate data to facilitate catastrophe response and resource allocation (Adejuwon & Albert, 2025).

Government agencies, emergency management structures, and community structures are valuable in flood Institutional and Capacity Building. Bangladesh-based research on the 2017 floods discovered that governmental organizations (GOs) were doing great in preparing meetings and shelter arrangements, whereas NGOs were doing great in awareness training. GOs were involved in the provision of housing and cash assistance, and NGOs in the provision of food, water, medications,

and necessities (Hossain, 2020). Atanga, (2020) In their research findings in Accra, Ghana found that the community leaders in flood-prone areas are only involved in the implementation phase of the flood risk management strategies. Mark *et al*., (2025) have found that in Anambra State, Nigeria, emergency management agencies have attempted to mitigate the impact of floods but have not succeeded because of poor funding, absence of equipment and facilities, and because communities do not take proactive actions but wait until floods occur before evacuating. The same evaluation of NEMA Act in Nigeria concluded that it is weak in disaster management because of three main problems: 1) it focuses on the development of NEMA and not disaster management plans, 2) it does not give directions on how the stakeholders should mobilize resources to the work, and 3) it does not empower NEMA to enforce disaster risk reduction in other agencies activities (Mashi & Oghenejabor, 2019). Kogi state government has done a lot of floodplain mapping to show vulnerable areas, and interventions can be made. This exercise has assisted the state in identifying areas that should be given special care, and these areas include: flood defences, drains and exit roads (Adams, 2024). In a recent study by Yakubu *et al*., (2022), it was discovered that Nigeria requires capacity building in the flood-prone regions, specifically the state of Kogi, to ensure that the local communities are able to recognize the hazards, manage the risks, and implement precautions. The research revealed gaps in the standard of the built environment, record keeping and data on disasters, and therefore there was a need to train and develop infrastructure to minimize the effects of disasters. In the study conducted by Ogunwumi and Ihinegbu (2025), the household preparedness to floods in the Last-Mile Communities is based on the gender of the household head in Kogi State. Although the agencies do not provide flood education to the people, the household heads are the ones who are instrumental in informing their communities about flooding.

Flood management in Nigeria has many challenges that are being experienced by institutions and individuals, such as scarcity of resources, inadequately skilled staff, communication facilities, infrastructure, and technology facilities to assist in the rapid response and application to effective management of disasters in Nigeria (Uyimleshi, 2023). Adefisoye and Arum (2021) established low institutional capacity, lack of funding and bureaucratic corruption as some of the causes of low improved flooding service delivery in Nigeria. A case study conducted in Lugbe community, Abuja, Nigeria, established that economic activities and social services are disrupted by the flooding, and it prevents resettlement. Among the critical issues are failed planning and budget analysis (Yusuf *et al*., 2023).

Despite the numerous studies on the causes and effects of floods in Nigeria and around the world, the majority of studies are primarily concerned with environmental destruction and flood susceptibility, but only a few studies are interested in the role of institutional structures and capacity-building in flood management, particularly in the local sphere. Research in Lokoja metropolis has more or less focused on flood risks and effects, yet has failed to sufficiently evaluate the role of institutions and capacity-building efforts in effective flood mitigation and preparedness. The proposed study thus bridges this gap by assessing the institutional and capacity-building activities towards flood management in Lokoja metropolis to determine the current gaps and enhance disaster preparedness.

This research seeks to evaluate the management of floods in Lokoja metropolis, especially the institutional response and capacity building. Particularly, the paper will focus on the key causes of the flooding in the region, gauge the effort of the concerned institutions dealing with the flood disasters, determine the degree of capacity building on the flood preparedness and mitigation, and determine the current gaps in the flood management measures.

The research is significant in that it offers practical information to the urban planners, environmental managers and policy makers interested in flood management and environmental management. It will also be helpful to the government agencies and disaster management bodies to enhance their flood preparedness and response plans. Moreover, it also adds to the current understanding of environmental management and the process of disaster reduction in urban areas exposed to floods.

The Study Area

Lokoja is a central Nigerian city (Britannica, n.d.). It is at the point where the Niger and Benue rivers converge, and the capital city of Kogi State (Encyclopædia Britannica, n.d.). The 1917 township ordinance of the colonial government ranked Lokoja second class township, which means that Lokoja is an ancient city.

The study area is located in Lokoja, at latitude 7˚45'0"N to 7˚53'30"N and longitude 6˚43'0"E to 6˚51'30"E (see Figure 1), with a total land area of 29,833 km^2 (Adefisan & Egiku, 2018).

Lokoja lies about 7.8023° North of the equator and 6.7333° East of the Meridian (Federal University Lokoja, n.d.). It is about 165 km southwest of Abuja as the crow flies, and 390 km Northeast of Lagos by the same measure. The town is situated in the tropical Wet and Dry savanna climate zone of Nigeria, and temperatures remain hot year-round. Rain begins in May and typically ends in October. Lokoja has a maximum temperature of about 37.9 °C between December and April, an average annual rainfall of about 1000mm and an average relative humidity of about 60% during the rainy season (ResearchGate, n.d.)

Nigeria has two major drainage systems flowing through it: the Rivers Niger and Benue that divide the country into three unequal geographical regions with a confluence in the Lokoja area of Kogi State, making Kogi State and Lokoja in particular one of the areas frequently affected by floods (Oluwaseun *et al*., 2013).

Although the indigenous peoples of the region include the Bassa Nge, Yoruba (mainly the Oworo, a subdivision of the Yoruba), and Nupe, other ethnic groups in Nigeria, such as the Kupa-Nupe, Hausa, Ebira, Igala, Igbo, Bini/Edo, and Tiv, have more recently settled. Lokoja is projected to be the third fastest growing city on the African continent between 2020 and 2025, with a 5.93% growth rate (Visual Capitalist, 2021).

Economic activities such as agriculture, spinning, weaving, blacksmithing, pottery, dyeing, fishing, etc are carried out by the various ethnic groups in Lokoja (Audu, 2009), with agriculture being the main occupation of the people.

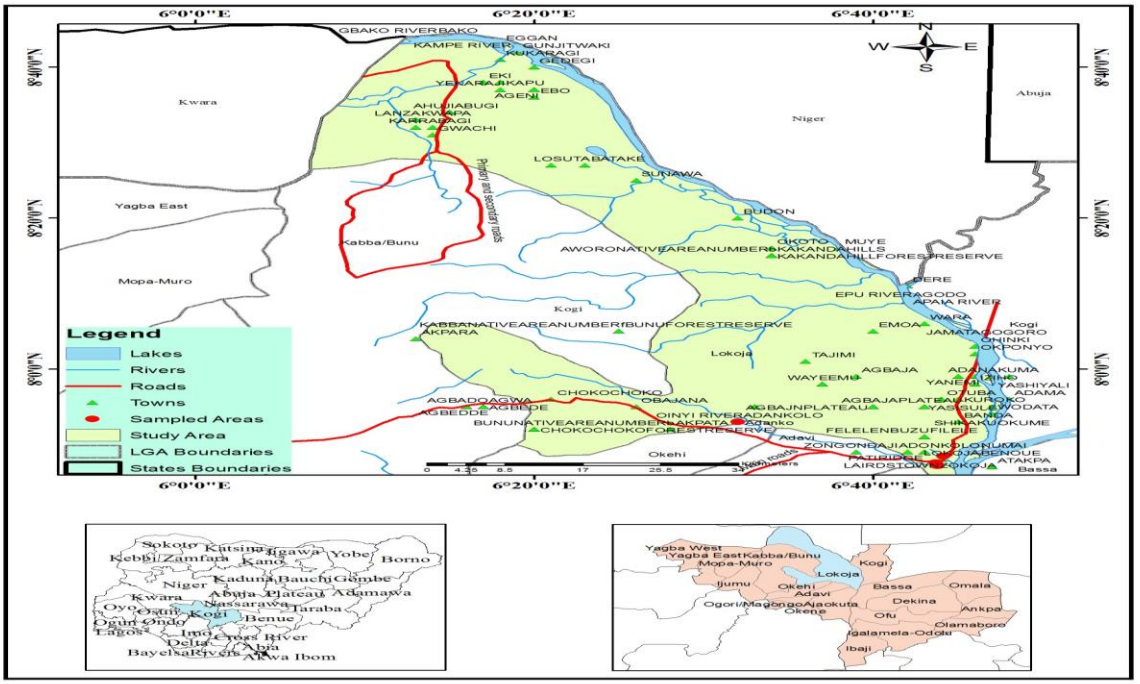

Figure 1: Map of Lokoja, Kogi State
Source: Adapted from the Administrative Map of Kogi State, 2019

MATERIALS AND METHODS

The method used in this study will be as shown under the following paragraphs: data types and sources, questionnaire design and administration, sampling procedure and data analysis methods. The paper analyses flood institutional and capacity building in Lokoja, Kogi State.

The study was carried out using both primary and secondary data. Primary data were collected in the field with the help of field observation and by using questionnaires from residents in the field area of the study. Field observation was a relevant technique to determine environmental conditions and physical aspects of flooding in the region. Relevant publications and documented materials, including textbooks, academic journals, reports by the Ministry of Land, Housing and Urban Development, among other materials that were available through the internet, provided the secondary data. These sources gave the background information, which was pertinent to the flood management and institutional capacity building.

Population, Sample Size and Sampling Technique

The study population was made up of about 3,512 housing units in the floodplain territories of Lokoja metropolis. The Taro Yamane sample size formula was applied to get the sample size of 400 respondents. The selection of respondents was done using a multistage sampling technique. To select the households in the flood-prone areas of the metropolis, first, purposive sampling was applied. This was then followed by the application of simple random sampling that was used to sample the specific households in which questionnaires were given. Lastly, there was systematic sampling that was used in selecting the households at an interval of every tenth house. Such a method guaranteed sufficient coverage of space in the area of the study.

Data Analysis

The collected data were analysed descriptively. These were in the form of tables, counts of frequencies, simple percentages, charts, Likert scale analysis, and the Relative Importance Index. The Relative Importance Index was applied so as to establish the most crucial causes of flooding in the area of study. The evaluation of the institutional and capacity building of floods was carried out through the answers provided by the heads of households and fieldwork. To make the results easy to understand and interpret, the analysed results were presented in tables, frequency distributions, and simple percentages

RESULTS AND DISCUSSION

Demographic information of respondents

Table 1 below shows the socio-economic factors of the respondents in the study area. The outcome indicates that males make 64% of the respondents and females make 36%. This shows that the majority of the household heads within the study area are men and this is not peculiar to the majority of the Nigerian societies where in most cases men tend to be the household representatives in social and environmental issues.

The age distribution also indicates that most of the respondents belong to the active age group especially 25-34 years which constitutes 42, 35-44 years and 45-54 years at 23 each. The proportion that is below 15-24 years and above 55 years are also low at only 6% and 6% respectively. This means that the majority of the respondents are youthful adults and are likely to be experienced and aware of the floods experienced in the region.

The distribution of marital status also indicates that 53% of the respondents are married and 26% are single, 10% are widowed, 9% are divorced and 2% are separated. The large percentage of married respondents can be attributed to the family settlement pattern that is typical of most Nigerian communities where marriage is seen as an indicator of duty and social status. The same was stated by Oyedele *et al.,* (2022) who observed that in flood-prone communities located in Kogi State, during disaster events, the household heads are adults, most of them in charge of family welfare as well as making decisions.

The occupational distribution indicates that fishing is the most prevalent occupation with 46 percent of the respondents, the next occupation is farming with 24 percent and business activities make 16 percent. Civil servants constitute 6% with social workers having 5% and the rest of the population constituting those in other occupations including artisans and petty traders. The large proportion of fishermen is also attributable to the geographical position of Lokoja at the point of convergence of River Niger and River Benue, which gives the fishermen a chance to fish and engage in other related activities. This observation is in line with the observations of Buba *et al*. (2021), who noted that most of the households in Lokoja relied on activities along the rivers due to their location near the rivers. The educational attainment of respondents means that 51% of them have secondary education, 27% have primary education, 16% have no formal education, and only 6% of the respondents are tertiary-educated. This implies that there is a fair percentage of the population which is literate and can comprehend matters concerning flood prevailing and coping.

The size distribution of households also reveals that moderate-sized families of 1-5 persons (54%), and 6-10 persons (37%), prevail in the household population. It is similar to the results published by Osayomi *et al.,* (2022), who found out that most households in flood-prone areas of Kogi State comprise medium-size family units that are heavily relying on the local economic activities.

In terms of income, 40% of the respondents earn below ₦30,000 per month, 33% earn between ₦31,000 and ₦60,000, 21% earn between ₦61,000 and ₦90,000, while only 6% earn between ₦91,000 and ₦120,000. This indicates that a high percentage of the respondents are in the low-income bracket. Low income has been cited as a key factor that predisposes to disasters of floods since most of the households that have low income do not have the means to prepare, respond and recover in the event of a disaster. Hallegatte *et al.,* (2020) clarified that the poor households in the developing countries are more exposed to the environmental hazards and have less resources to absorb the effects of a disaster. On the same note, Emmanuel *et al.,* (2024) established that economic activities were significantly impacted by flooding in Lokoja especially small businesses and low-income earners households.

Table 1: Socio-economic Characteristics of Respondents in the Study Area

A. Sex	Frequency	Percentage (%)
Male	256	64
Female	144	36
Total	**400**	**100**

B. Age (Years)		
15-24	92	06
25-34	168	42
35-44	91	23
45-54	25	23
55 and above	24	06
Total	**400**	**100**
C. Marital Status		
Single	104	26
Married	214	53
Divorced	36	09
Widow/Widower	40	10
Separated	06	02
Total	**400**	**100**
D. Occupation Fishermen		
Business Men	143	46
Farmers	64	16
Civil Servants	56	24
Social Workers	63	06
Others	49	05
Total	25	03
	400	**100**
E. Level of Education		
No formal education	64	16
Primary	108	27
Secondary	203	51
Tertiary	25	06
Total	**400**	**100**
F. Household Size		
1-5	218	54
6-10	146	37
11-15	25	06
16 and above	11	03
Total	**400**	**100**
G. Monthly Income (₦) Below 30,000		
31,000 – 60,000	159	40
61,000 – 90,000	131	33
91,000 – 120,000	83	21
Total	27	06
	400	**100**

Source: Author's Field Work (2019)

Causes of Flood Disaster in Lokoja

Table 2 below results show that floods in Lokoja are seen by respondents to be caused by a multitude of factors. The mean of 3.61 is cumulative and indicates that there is general agreement in the fact that human and environmental factors affect flooding. It is worth noting that the most important causes were found to be illegal development and poorly constructed drainage systems, which had a mean of 4.52 each.

On the other hand, heavy rain was taken as a minor event, having a mean of 2.75, which implies that the natural rainfall does not contribute much to floods in the region. These findings are consistent with earlier reports, which highlight the contribution of human activities to enhancing the risks of floods. Adegboyega *et al*. (2018) and Echendu (2021) noted that bad urban planning, unchecked construction and blocked or insufficient drainage systems are significant causes of urban flooding in Nigeria. On the same note, the Nigeria Hydrological Services Agency (2020) reported that even though the intensity of rainfall influences the amount of water that accumulates, the absence of proper drainage systems and unauthorized settlements in floodplains make floods especially dangerous. Thus, the research proves that in

Lokoja, anthropogenic factors, especially the unlawful development and the inability to control the drainage, are the leading factors behind the flood disasters.

Table 2: Respondents' Opinion on the Causes of Flooding in the Study Area

Item		Responses SA	A	UD	D	SD	Mean	Std. Dev.	Remark
Excessive Rainfall		152	42	0	0	206	2.75	1.86	Disagreed
Inadequate drainage Pattern		180	30	6	72	112	3.02	1.66	Agreed
Improper Refuse disposal on Drainage system		145	102	22	1	130	3.23	1.75	Agreed
Illegal Development		280	72	36	0	12	4.52	0.92	Agreed
Improper Drainage System		241	106	29	0	24	4.52	0.92	Agreed
Cumulative							**3.61**	**1.42**	

Benchmark: Mean
≥3.00 = Agreed; Mean
< 3.00 =Disagreed
Source: Authors
Survey, 2019

Capacity Building at the Individual Level

Table 3 shows that the level of capacity building on flood preparedness at the individual level in Lokoja is low. The majority of households (53.5%) spend 0-2 hours per month in flood preparedness activities, and only 17.5% spend more than five hours. This indicates that most of the residents are not sufficiently active in accumulating knowledge and skills on how to mitigate flood risks. Reduced participation in capacity-building can be caused by either the absence of awareness or the lower priority that flood preparedness has been given, or the lack of knowledge of the possible consequences of floods.

The data also indicate that 85.25% of households are uninsured to cover flood disasters, and the primary reasons are that it is not valuable (54.25%), costly (25.22%), or new (10%). The proportion of people with an insurance plan is very low (only 14.75%), which demonstrates a great disparity in financial readiness to disaster hazards.

These findings are supported by empirical research. According to Ogunwumi and Ihinegbu (2025), household preparedness depends on the awareness and education levels of the household heads in Kogi State, and low household engagement in most of the last-mile communities. On the same note, Yakubu *et al.*, (2022) stressed that the individual and community level capacity building is extremely important in the process of reducing the flood risk, but lacks in most instances because of lack of proper training, access to resources, and prioritization by households. Nche (2024) also mentioned that the proactive efforts are relatively not in place in Lokoja, as people are used to extensive government interventions, which highlights the necessity of more individual and household-level preparedness programs.

These are some of the implications that become such, strengthening personal knowledge, enhancing flood education and increasing insurance taking must be taken as critical measures to mitigate vulnerability and enhance resilience to floods in the study area.

Table 3: Capacity Building for Individuals

Time Spent on Building Capacity for Flood	Frequency	Percentage
0-2 hours	214	53.5
2-4 hours	115	28.75
5-7 hours	51	12.75
8hours and above	20	05
Total	400	100.0

Household Insurance Plan against Flood		
Yes	59	14.75 85.25
No	341	100.0
Total	400	
Reasons for Non-Insurance against Flood		7.92
Not located in the floodplain	27	25.22
Premium too high	86	54.25
Not worth it	185	2.93 8.21
Not familiar with it/don't know about it	10	1.47
Not necessary	28	100.0
Never considered it	05	
Total	341	

Source: Authors Survey (2019)

Effectiveness of Household Capacity Building

In Table 4, the results show that household-level capacity building in flood preparedness in Lokoja is not effective. In sum, 76 % of households cannot afford the minimum needs of capacity building, and only 16.9 % have done significant preparedness actions.

Discussing flood emergency plans at home (48.25%) and attending a meeting or reading written information about flood preparedness (21.75%) had the highest number of responses recorded. Nonetheless, the levels of critical preparedness, including creating a family emergency plan, assembling a disaster supply kit, or training in first aid/CPR, were very low with less than 10% of participants indicating their involvement in the specific activity. This shows that even as there are simple conversations on the dangers of floods in some of the households, detailed preparedness measures are not given much attention.

The ineffectiveness of household capacity building seriously impacts sustainable development. Disasters like floods increase poverty and economic recovery, especially among low-income households as witnessed in literature by Hallegatte *et al.* (2020) and Emmanuel *et al.* (2024) which revealed that floods in Lokoja severely affected small business and livelihoods.

These results are backed by empirical studies conducted in Nigeria. As noted by Yakubu *et al.* (2022), capacity-building initiatives in flood-prone regions such as Kogi state do not always involve households in their activities, which leads to low knowledge on risk mitigation measures. Ogunwumi and Ihinegbu (2025) also discovered that the preparation of households in last-mile groups is greatly reliant on the individual effort, but the majority of local communities were not trained, informed, and did not have the necessary resources at their disposal. Buba *et al.*, (2021) also observed that in Lokoja, the low representation of households in the disaster management programs diminishes the effectiveness of interventions in flood preparedness in most cases.

Table 4: Effectiveness of Household Capacity Building

ACTIVITY	Have Done	Plan t o Do	Not Done	Unable to Do	Total
Attended meetings or received written information on flood disaster or emergency preparedness?	87 (21.75%)	41 (10.25%)	57 (14.25%)	215 (53.75%)	400 (100%)
Talked with members in your household about what to do in case of a flood disaster or emergency?	193 (48.25%)	72 (18%)	84 (21%)	51 (12.75%)	400 (100%)
Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in event of a household emergency?	28 (7%)	41 (10.25%)	29 (7.25%)	302 (75.5%)	400 (100%)

Prepared a "Disaster Supply Kit" (Stored extra food, water, batteries, or other emergency supplies)?	12 (3%)	35 (8.75%)	14 (3.5%)	339 (84.75%)	400 (100%)
In the last year, has anyone in your household trained in first aid or Cardio-Pulmonary Resuscitation (CPR)?	18 (4.5%)	31 (7.75%)	47 (11.75%)	304 (76%)	400 (100%)
Total Frequency	**338**	**220**	**231**	**1211**	**2000**
Relative Percentage	**16.9%**	**11%**	**11.55%**	**60.55%**	**100%**

Source: Author's Field Survey (2019)

Capacity Building at the Institutional Level by the State Government

The evaluation of institutional-level capacity building of the State Government in Lokoja metropolis indicates a great gap in flood control and disaster response. Table 5 indicates that there were 62.47% who never witnessed the measures of institutional capacity-building, 19.12% were not sure, and only 18.41% witnessed its practice. This implies that there is poor institutional support, and the households are left to make their own modest preparations.

The most monitored indicators were the number and quality of guidelines, regulatory standards and information dissemination (39.75%), the next indicators were the documentation of past experience and accumulation of research (33%). This implies the fact that although there are some structures, flood laws, emergency response and city planning are still weak. Institutional capacity should thus be interested in the performance of the organization, management, and coordination by using agencies like SEMA and NEMA. The findings support the study by Olajuyigbe, Rotowa and Durojaye (2025), who observed that the vulnerability of the urban floods in Nigeria can be worsened by weak government capacity and dismal institutional frameworks.

These results are also supported by empirical studies. Mark, Iweama & Iweama (2025) discovered that the challenges were the result of little equipment, ineffective funding and absence of proactive community actions in the emergency management agencies of Anambra State. On the same note, Yakubu *et al.,* (2022) noted that there should be local capacity building in Kogi State to enable communities to recognize hazards, measure the risk, and take preventative measures. Ogunwumi and Ihinegbu (2025) emphasized the importance of the household heads in informing the communities about flood preparedness, even with the lack of institutional support. Institutional effectiveness is also hampered by challenges like low inter-agency coordination, insufficient resources and bureaucratic inefficiencies (Uyimleshi, 2023; Adefisoye & Arum, 2021; Yusuf *et al.*, 2023).

The significance of institutional participation in disaster management is proven worldwide. Hossain (2020) discovered that in Bangladesh, the shelters and housing were under effective management by government agencies, whereas the awareness and emergency response programs were under the leadership of NGOs. Atanga (2020) indicated that the community leaders in Accra were involved in the implementation phase, which curtailed the performance of the flood risk management strategies.

Table 5: Effectiveness of Institutional Capacity Building

ACTIVITY	Observed	Undecided	Not Observed	Total
Laws and regulations to facilitate restoration, urgent measures, stabilize people's lives, revitalize economic activities, etc.	72 (18%)	34 (8.5%)	294 (73.5%)	400 (100%)
Activities of relevant organizations, intersectoral cooperation and coordination to effectively prepare you and your household against floods	32 (8%)	87 (21.75%)	281 (70.25%)	400 (100%)

Laws and regulations to control new development, land acquisition in flood plain, relocation from floodplain, IDP camp formation, law enforcement etc.	56 (14%)	73 (18.25%)	271 (67.75%)	400 (100%)
Laws and regulations for flood fighting, warning, evacuation, etc., law enforcement	16 (4%)	45 (11.25%)	339 (84.75%)	400 (100%)
Adequacy of number and distribution of stations, data quality, period and frequency, and data accessibility	74 (18.5%)	211 (52.75%)	115 (28.75%)	400 (100%)
Quantity and quality of guidelines, regulatory standards, and dissemination of guidelines	159 (39.75%)	100 (25%)	141 (35.25%)	400 (100%)
Past relevant research, accumulation of similar experiences, and documentation of past experience	132 (33%)	25 (6.25%)	243 (60.75)	400 (100%)
Existence of flood management master plans, update frequency, and quality	48 (12%)	37 (9.25%)	315 (78.75%)	400 (100%)
Total Frequency	**589**	**612**	**1999**	**3200**
Relative Percentage	**18.41%**	**19.12%**	**62.47%**	**100%**

Source: Author's Field Survey (2019)

Capacity Building at Systemic Level

The systemic-level capacity building in the assessment of flood management in Lokoja reveals significant gaps in planning, infrastructure and operation. Table 6 shows that systemic preparedness is mostly absent, as 70.93% of the respondents reported that they never saw systemic capacity-building indicators, 17.64% were unsure, and only 11.43% said they did.

Some indicators e.g., planning and designing procedures (18.5%), formulation of flood management alternatives (14.5%), were marginally recorded, which implies that there was low awareness of systemic processes. These results are consistent to those of Mark, Iweama and Iweama (2025) who observed that in Nigeria, emergency management agencies are usually resource-strained and not proactive in responding to floods. Yakubu *et al.*, (2022) also emphasized the importance of organized planning and integration of resources in flood-prone regions.

The same challenges have been reported within the state and internationally. Bottazzi, Winkler and Speranza (2019) observed that poor systemic planning and infrastructure maintenance diminished flood mitigation in Dakar, whereas Ogunwumi and Ihinegbu (2025) reported that poor infrastructure and emergency services reduced household preparedness in Nigeria. It was also found that low institutional and systemic capacity, ineffective coordination, and inadequate funding were also the main limitation to flood service delivery (Adefisoye & Arum, 2021; Yusuf *et al*., 2023).

Table 6: Effectiveness of Systemic Capacity Building

ACTIVITY	Observed	Undecided	Not Observed	Total
Volume of flood control storage, operation and maintenance of facilities in your locality	23 (5.75%)	46 (11.5%)	331 (82.75%)	400 (100%)
Availability and dimensions of levees, maintenance of levees to control or recede water	36 (9%)	81 (20.25%)	283 (70.75%)	400 (100%)

Adequacy of quantity and quality of facilities, operation and maintenance of facilities	51 (12.75%)	57 (14.25%)	292 (73%)	400 (100%)
Level and adequacy of planning and designing Procedures	74 (18.5%)	49 (12.25%)	277 (69.25%)	400 (100%)
Training, temporary levee reinforcement, patrol andwarning, evacuation, relief	50 (12.5%)	71 (17.75%)	279 (69.75%)	400 (100%)
Proper registration of flood management facilities	28 (7%)	96 (24%)	276 (69%)	400 (100%)
Flood management alternatives formulated and prioritized by integrating available resources appropriately	58 (14.5%)	94 (23.5%)	248 (62%)	400 (100%)
Total Frequency	320	494	1986	2800
Relative Percentage	11.43%	17.64%	70.93%	100%

Source: Authors Survey (2019)

CONCLUSION

This study has highlighted that the impact of flooding in Lokoja metropolis is mainly due to human factors, including unplanned development and poor drainage infrastructure, which are aggravated by low community readiness and poor institutional support. The individual household level is not actively involved in capacity-building, and the state, and other systemic interventions are underdeveloped, not coordinated, and lack resources, which makes them very susceptible to repeat cases of flood disasters. This scenario creates an urgent necessity of a complex strategy, which fortifies institutional structures, imposes the city planning laws, advances active community education, and incorporates systematic capacity-building. In the absence of these combined efforts, the threat of flooding will persist to cause risks to life, livelihood and sustainable development of the Lokoja population hence urgent response to the long-term resiliency and sound management of the environment is imperative.

RECOMMENDATIONS

Enhance Drainage Infrastructure: Drainage systems should be properly maintained and upgraded on a regular basis, and illegal developments along flood-prone lands should be avoided to minimize waterlogging and overflow during heavy rains.

Increase Community Awareness and Training: Government should hold monthly workshops and outreach activities to inform the residents about flood preparedness, early warning and emergency response efforts.

Foster Preparedness at the Household Level: Advocate for emergency plans, disaster supply kits, and affordable flood insurance at the household level to decrease vulnerability.

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