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Determining The Number of People Impacted by Flooding in Niger State of Nigeria

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ABSTRACT

The flooding in Niger state has affected a significant population of people, with its devastating impact felt by both rural and urban communities. According to recent reports, the number of affected individuals has reached an alarming number, with thousands being forced to evacuate their homes and seek shelter in temporary camps. The flooding has caused severe damage to infrastructure and disrupted the daily lives of the affected population. As a result, this paper established the population of people affected by flooding in the study area. This study utilized descriptive research design to systematically collect data on the affected populations. It involves collecting numerical data to quantify the extent of the population affected - Target population, residing in flood-prone areas of Niger State: Muregi, Gbajibo, Essan, Gurmana, Gusuru, Bere, Akare, Wushishi and Maito. Using population records and structured questionnaires, descriptive statistics was used to provide overview of the population affected by flooding. The findings revealed that a projected population of about 16,211 people are vulnerable to flooding, 10,302 people are more vulnerable to flooding, 9,721 people are very vulnerable to flooding, 10,396 people are highly vulnerable to flood, while 6,396 people are extremely vulnerable to flood. The study conclude that flood is a natural disaster but man contributes significantly to its occurrence due to his involvement in activities that disrupt the environment like encroachment of human activities on floodplains and violations of building regulations. It thereby recommends that settlements that are within or adjacent to the areas vulnerable to flooding should be resettled to most suitable areas identified in the study.

Keywords: Population, People, Affected, Floods and Niger State

INTRODUCTION

Niger State, located in the central region of Nigeria, is known for its extensive river systems and rich agricultural landscape. However, the state is also susceptible to flooding, particularly during the rainy season. This natural disaster significantly impacts the human population, displacing thousands of residents, destroying homes, and affecting livelihoods (James *et al.*, 2015; Arnell, Kay, Freeman, Rudd, & Lowe, 2021; Martire, Hausleitner, & Clossick, 2023; Shaw & Saharan, 2018). Flooding in Niger State is primarily caused by heavy rainfall, river overflow, and inadequate drainage systems. The annual wet season, typically occurring between June and September, brings torrential downpours that often exceed the capacity of local rivers and streams. The Niger River, one of the longest rivers in Africa, runs through the state, and its periodic overflow can lead to significant flooding in surrounding communities. Urban and rural areas alike, particularly those lacking proper infrastructure, face the brunt of such natural disasters.

As of recent reports, significant flooding in Niger State has affected over 200,000 individuals, with many displaced from

their homes and local communities (Ajibola, 2019). The floods impact different demographic groups, including vulnerable populations such as women, children, and the elderly. Displacement often leads to overcrowding in temporary shelters and camps, where basic amenities become scarce (Ojobe *et al.*, 2021). The provision of food, clean water, and healthcare becomes critical, as there are heightened risks of waterborne diseases and malnutrition. The economic impact of flooding is substantial, with the agricultural sector being particularly hard hit. Niger State is a major contributor to food production in Nigeria, and flooding destroys crops, disrupts planting seasons, and leads to food shortages. Farmers often lose their livelihoods, exacerbating poverty levels in many largely agrarian rural communities. Hence, the loss of livestock due to flooding further elevates the economic strain on families that depend on agriculture and animal husbandry for survival (José, Neto, & Heller, 2016; Egberta and Falana, 2020; Meerow, 2021; Reckner & Tien, 2023).

The population's vulnerability to flooding is compounded by socio-economic factors. Many residents in rural and peri-urban areas live below the poverty line, making it challenging to invest in protective measures or recover from disasters. Additionally, limited access to education and timely information are known to hamper communities' effective preparedness and response to devastating flooding events (Bhowmik, Irfanullah, & Selim, 2021; Lubaina, Asifa, & Ayesha, 2025; Salvati *et al.*, 2021; Thompson, Wilby, Hillier, Connell, & Saville, 2022). Awareness campaigns on the risks of flooding, proper drainage maintenance, and the importance of sustainable land use practices are crucial to enhancing community resilience (Anunobi, 2015).

STATEMENT OF RESEARCH PROBLEM

Riverine areas of Niger State have suffered devastating flooding events for decades; with the four (4) most recent ones been in 2008, 2009, 2012 and 2018. As usual this has caused displacement of people from their dwelling places resulting into varying impacts on infrastructure, crops, health, education, environment as well as damage to property (NSEMA, Assessment of Floods Report, 2013). The general problem of the communities is the frequent annual flood disasters that usually claim lives and properties. A lot of money has been sunk in developing a resettlement scheme like New Bussa, New Gbajibo, New Muregi and New Akare by providing infrastructure facilities, yet the community are not ready to move away from the disaster-prone areas (Tellman, Sullivan, & Doyle, 2021). Some noticeable challenges of resettlement schemes are the cost required for implementation of full resettlement programme could exceed the financial capacity of the State or may be the planning process involved in the resettlement was not properly managed and implemented. Some other outstanding problems that affect the resettlement are the absence of social infrastructure in the settlement sites. For example, in the absence of schools, health facilities, motorable roads, communication networks, etc., could make the life of resettles burdensome. Problems associated with these and similar other factors could create a challenge not only on the target group but also on the country's economy, host communities and the natural environment.

In Nigeria, several studies have been carried out on flood resettlement for instance the resettlement of a 50,000 multi-

ethnic population of Bussa resettlement, as a result of the construction of Kainji Dam in 1964 into a modern town called New Bussa (Gyuse & Gyuse, 2008; Oshodi, 2013; Gana *et al.*, 2019; Permejo, See, & Webster, 2026). In this scheme, it was states that seventeen out of two hundred and thirty-nine (239) beneficiaries were resettled in the first two years under cash compensation approach, this proved unsuccessful as the beneficiaries did very little to construct their own houses (Ahmadu *et al.*, 2022). Also, a study by Saidu (2015) confirms that, lack of community involvement in the decision-making process creates communication barrier between the beneficiaries and the scheme administrators of Loko resettlement scheme in Adamawa State, hence the resettlement impediments. Furthermore, communities in Jebba Lake Basin were resettled farther away from the shore of the River Niger with a total of 1,374 houses built during the resettlement scheme in the 21 resettled communities around the Basin (Ojobe *et al.*, 2021). Because of non-involvement of the community, the beneficiaries several shortcomings – like indication of “the size of the spaces provided been small” and inefficient (Egbenta and Falana, 2020). Few studies were carried out on population of people affected by flooding in Niger State. Therefore, this study aims to fill these knowledge gaps and analysis the population of people affected by flooding in the study area.

AIM OF THE STUDY

The aim of the study is to establish the population of people affected by flooding in the study area.

STUDY AREA

The State lies on Latitude 8° to 11° 30’ North and Longitude 03° 30’ to 07° 40’ East. The State is bordered to the North by Zamfara State, West by Kebbi State, South by Kogi State, South West by Kwara State, North-East by Kaduna State and South East by the FCT. The State also has International Boundary with the Republic of Benin along Agwara and Borgu LGAs to the North West. In the present political zoning system, it is within the North Central Zone, and occupies an area of 76,363 square kilometres. The state has three senatorial districts namely: Zone A, Zone B and Zone C. Figure 1 show a map of the study area.

The state is named after the River Niger. It is home to Nigeria’s two major hydroelectric power stations, the Kainji Dam and Shiroro Dam, are located along with the new Zungeru Dam. The Jebba Dam straddles the border of Niger state and Kwara state. The famous Gurara Water Falls is in Niger State, and Gurara Local Government Area is named after the Gurara River, on whose course the fall is situated. Also situated there is Kainji National Park, the largest National Park of Nigeria, which contains Kainji Lake, the Borgu Game Reserve and the Zugerma Game Reserve (NS, 1999).

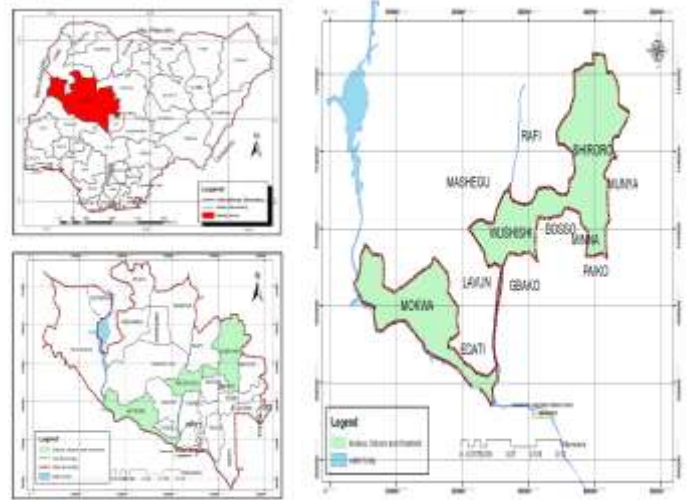


Figure 1: Selected LGA for the Study area
Source: NIGIS, Minna (2023)

METHODOLOGY

This study utilized a descriptive research design to systematically collect data on the population affected by flooding. It involves collecting numerical data to quantify the extent of the population affected. Data were gathering through narratives and contextual information related to the flooding incidents and their effects on individuals and communities. The target population for this study comprised individuals residing in flood-prone areas of Niger State. This includes: Muregi, Gbajibo, Essan, Gurmana, Gusuru, Bere, Akare, Wushishi and Maito.

The Population of the study area comprises of nine (9) communities, three (3) in each zone was 53,027 according to projected population from National Population Commission (2022). Therefore, the total population of the study area were used as sample frame for this research.

Table 1: Population of the sampled communities

S/NO	Community	Projected Population
1	Muregi	3367
2	Gbajibo	5843
3	Essan	6906
4	Gurmana	4387
5	Gusuru	3315
6	Bere	7332
7	Akare	8667
8	Wushishi	11367
9	Maito	1843
	Total	53,027

Source: NPC 2023

A stratified random sampling method was adopted to ensure representation from various demographics within the affected areas. The population was stratified based on socio-economic status, age, gender, and geographical location. Cochran formula was used, an appropriate sample size will be calculated to ensure statistical significance, resulting in a sample of approximately 400 households.

Structured questionnaires were distributed to the sampled households. The questionnaires include: Demographic information (age, gender, occupation, etc.); Assessment of flooding impact (property damage, displacement, economic loss, etc.) and Recovery status and needs following flooding events. The quantitative data obtained from surveys was analyzed using statistical software such as SPSS. Descriptive statistics (frequencies, percentages, means) was calculated to provide an overview of the population affected by flooding.

Inferential statistics, such as chi-square tests, may be employed to determine relationships between demographic variables and flooding impact.

RESULT OF FINDINGS

Population of People Affected by Flooding in the Study Area

In order to determine the population at risk of flood in the study area, point location of communities affected in the study area were overlaid on the flood vulnerability map as recommended by the United Nations Environment Programme (UNEP, 1998) and localities that fall within the zones were noted and their 2006 population figures was projected to the year 2023. This method was adopted because population data by wards that would have given detailed information was unavailable as at the time of this research. This information is shown in Table 2.

Table 2: Population of the sampled communities

S/NO	Community	Projected Population
1	Muregi	3367
2	Gbajibo	5843
3	Essan	6906
4	Gurmana	4387
5	Gusuru	3315
6	Bere	7332
7	Akare	8667
8	Wushishi	11367
9	Maito	1843
	Total	53,027

Source: Authors Field Survey, 2024

The projected population figures generated were based on projection that assumed the population of the communities with a population increase rate of 3% per annum. From the results, it was revealed that a projected population of about 16,211 people are vulnerable to flooding, 10,302 people are more vulnerable to flooding, 9,721 people are very vulnerable to flooding, 10,396 people are highly vulnerable to flood, while 6,396 people are extremely vulnerable to flood.

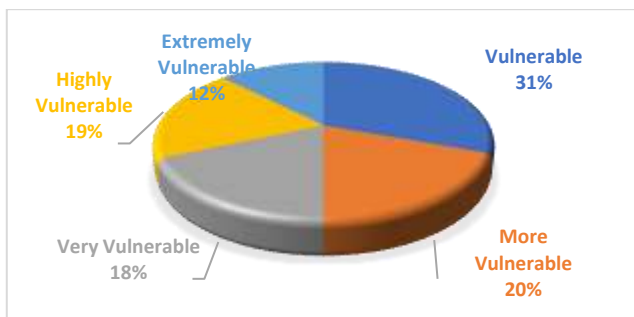


Figure 2: Percentage of vulnerable people affected by floods

Source: Authors Field Survey, 2024

The field study carried out revealed that the residents of the communities have a long history of settlement along the river banks in the study area with most of the resident engaging majorly in farming and fishing along the rivers. Mud houses are seen constructed on these lands and occupied by the resident, and in recent years few houses have been replaced by concrete bricks in the study area.

Vulnerability Level of Population Affected by Floods

Population distribution is considered as one of the instrumental components of vulnerability determination of floods. Higher sensitivity is expected in population with poor living conditions such as malnutrition, overcrowding and inadequate access to health facilities. Four different indicators of flood vulnerability were considered to analysis population affected by flooding in the study areas, the indicators are population density, female population density, literate rate and employment rate (Table 3).

Table 3: Matrix for flood vulnerability indicators

Flood Vulnerability Indicators	Population Density	Female Population Density
Population Density	1	2
Female Population Density	0.5	1
Literacy Rate	0.25	0.33
Employment Rate	0.17	0.17

Source: Authors Field Survey, 2024

Population Density

The population density distribution is one of the instrumental components of vulnerability to floods. The higher the population density is, the higher the likelihood of life and economic losses. Population density was given the highest weight (Table 3). Figure 3 shows the population density map of the study area. The population density is categorized into the five density classes of very low, low, medium, high, and very high population densities. The most densely populated area in the area has a population range of 178–204 persons per square kilometre and is situated Gbajibo, Wushishi and Essan, while the lowest populated zone has a population density of 78–165 persons per square kilometre. Other areas with a very high population density are Gurumana and Akere. The analysis reveals a very low population density, and most of them are situated in Maito, Bere and Muregi. These very low and low population densities render them less vulnerable to flood disasters.

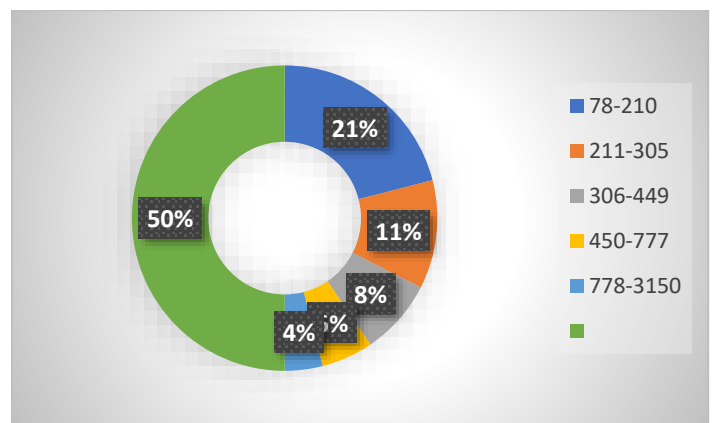


Figure 3: Population density map of the study area

Source: Authors Analysis, 2024

Female Population Density

The female population density of an area determines the area vulnerability to natural disasters such as floods. Women are perceived to be at a high risk amongst the vulnerable population. Figure 4.15 presents the female population density map of the study area. It is worth noting from the figure that entire areas have a very low female population density, 40–105 females/square kilometre. A very high female population density can be found in the central Zone

A and Zone C. A moderate female population density can be found in Zone B of the study area.

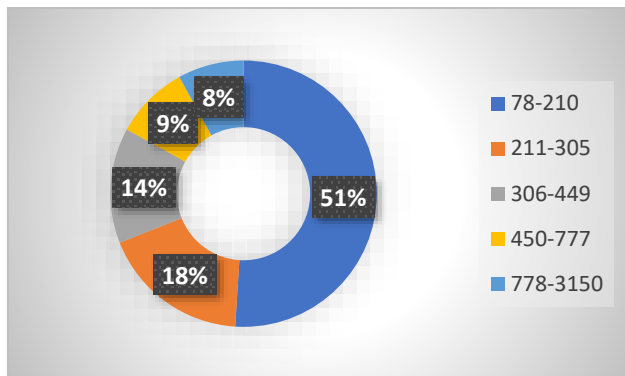


Figure 4: Female population Density map
Source: Authors Analysis, 2024

DISCUSSION OF FINDINGS

The projected population figures generated were based on projection that assumed the population of the communities with a population increase rate of 3% per annum. From the results, it was revealed that a projected population of about 16,211 people are vulnerable to flooding, 10,302 people are more vulnerable to flooding, 9,721 people are very vulnerable to flooding, 10,396 people are highly vulnerable to flood, while 6,396 people are extremely vulnerable to flood.

Population distribution is considered as one of the instrumental components of vulnerability determination of floods. Higher sensitivity is expected in population with poor living conditions such as malnutrition, overcrowding and inadequate access to health facilities. Four different indicators of flood vulnerability were considered to analysis population affected by flooding in the study areas, the indicators are population density, female population density, literate rate and employment rate

The population density distribution is one of the instrumental components of vulnerability to floods. The higher the population density is, the higher the likelihood of life and economic losses is population density was given the highest weight. The population density is categorized into the five density classes of very low, low, medium, high, and very high population densities. The most densely populated area in the area has a population range of 178–204 persons per square kilometre and is situated Gbajibo, Wushishi and Essan, while the lowest populated zone has a population density of 78–165 persons per square kilometre. Other areas with a very high population density are Gurumana and Akere. The analysis reveals a very low population density, and most of them are situated in Maito, Bere and Muregi. These very low and low population densities render them less vulnerable to flood disasters.

CONCLUSION AND RECOMMENDATIONS

The findings showed that the communities residing along the banks of Rivers Niger and Kaduna with low elevation are all prone to flood hazards. This means that buildings, the populace, the farming and crop cultivation activities within the area are at great risk of flood hazard. The study also revealed that a projected population of about 16,211 people are vulnerable to flooding, 10,302 people are more vulnerable to flooding, 9,721 people are very vulnerable to flooding, 10,396 people are highly vulnerable to flood, while

6,396 people are extremely vulnerable to flood. Thus, it can be concluded from this study that although flooding is a natural disaster, man contributes significantly to its occurrence due to his involvement in activities that disrupt the environment like encroachment of human activities on floodplains and violations of building regulations. It is recommended that:

1. Settlements within or adjacent to the areas vulnerable to flooding should be resettled to most suitable areas that are also safe as identified in the study.
2. The state government should endeavour to set aside adequate land for the re-settlement of the people and settlements that are presently vulnerable to flood.
3. Government at the local level should set up an agency that would monitor building and physical developments along riverine areas especially those at the increasingly vulnerable locations.
4. That, development control activities should not be limited to cities and towns, but to be extended to and effectively carried out in increasingly vulnerable rural communities in the State.

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