



Perceived effects of flood on lives and properties of the residents of Lokoja, Kogi State Nigeria

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General Note

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ABSTRACT

This study examines the perceived effects of flooding on lives and properties of the residents of Lokoja, Kogi State, Nigeria. The theory of resilience and concept of vulnerability provided the anchor while cross sectional survey research design was adopted for the study. Both primary and secondary data were sourced and multi-stage sampling technique was adopted where all the six communities (Adankolo, Felele, Ganaja, Lokongoma, and Sarkin Noma) affected were purposively surveyed. All the buildings that fell within 200 metres of the six floods affected communities were identified. The total numbers of buildings (2,018) were enumerated and 10% (202) of the sampled size were taken for the study. Issues that were considered included: Respondents socio-economic characteristics, respondents perceived number of flood occurrences in the study area, perceived impact of flooding on lives and infrastructure, level of household preparedness and diverse methods used in combating flood. Both quantitative (Logistic regression) and qualitative (FGD) techniques were used to analyze the data at $p \geq 0.05$ level of significance. The qualitative data collected were content analyzed. Flooding was discovered to cause damages to household properties (30.8%), household vehicles (3.5%), buildings collapse (0.5%), farmlands (7%) and death (0.4%). Although, more than 77.2% of the respondents were discovered to have been prepared for past flood events, but the nature of their preparedness were poor. The research also revealed significant

relationship between level of preparedness and the effect of severe flooding (0.246). Therefore, early warning system should be provided for the residents coupled with flood resilience buildings.

Keywords: Flooding, Coping Strategies, Disaster recovery, Preparedness, Indigenous knowledge

1. INTRODUCTION/STATEMENT OF PROBLEMS

Increase in climate and weather associated disaster and losses of property have been at alarming rate, even with accumulation of scientific knowledge (Alex and Walker, 2017). The 2012 flood event has amplified the need for flood management, with many noticeable flood disasters occurring in the urban areas. A study of frequency and duration of floods of 25 cities/towns in Nigeria was undertaken by Aderogba (2012). It was identified that Kogi state, Lokoja in particular, experienced one of the most devastating flood in the country. With; 24,476 houses destroyed; 102,567 people displaced; over 96 people killed and an estimated loss of 1.2 billion naira. Flood has become the most destructive environmental problems prevalent in Lokoja communities. With over 30% of the inhabitants of Lokoja live along the riverine area and survive mainly on agriculture and fishing (Nwilo, 2011). The problem of flooding which occur due to dam opening up stream, storm surges and sea-level rise constitute a substantial threat to life, property, livelihoods, and infrastructure in the riverine region (Ezirim, 2010). According to Aderoju *et al.*, (2014), a large percentage of the landmass of Lokoja was inundated by the 2012 flood. Regrettably, most of those areas inundated are places where these settlement carryout most of their economic activities like agricultural activities, trading and transportation activities. The consequences of these are that the inhabitants of the area and even people from distant places who depend on these activities are in serious danger of losing their means of livelihoods (NEMA, 2012).

The increasing rate of urbanization aggravates flooding extensively by restricting flood water pathways (Ojigi *et al.*, 2013). It has been documented that, in several cases, the devastation caused by floods, especially on households, is usually a reflection of their lack of preparedness. According to IFRC (2011), poor and low budgetary allocation, and none preparedness, for disaster preclusion in developing countries increases their likelihood of experiencing more severe impacts of natural disaster. There are non-existences of a country which is immune to flood event and the impacts this event is heightened by lack of capacity and preparedness. Hazards cannot be prevented from occurring, especially natural hazards such as flooding, but the vulnerability associated with flood disaster can be mitigated by adequate preparation. This level of effective preparedness can only be achieved with adequate knowledge of the disaster risk (Ismail and Opeluwa, 2013).

Several studies have been carried out on flooding. For Instance, Aderoju *et al.*, (2014), researched on the impact of 2012 flooding in Lokoja and found out that a huge proportion of the landmass of Lokoja was inundated by the 2012 flood and making people refugees and lost means of livelihood. Marginal land, floodplains or improperly planned and developed neighborhoods are characteristics of areas where the poor and marginalized, which form most of the percentage of urban flood victims, are found (Odufuwa *et al.*, 2012). While all the aforementioned studies have focused primarily on various issues relating to flooding, the one that addressed destruction on properties and lives has not been adequately captured in the literature. This study, therefore, seek to examine the perceived impact of flooding on lives and infrastructure of the residents of Lokoja, Kogi State, Nigeria. This is done with the aim of providing a sustainable solution to further flood occurrence in the area.

Study Area

Lokoja is located within latitudes 7° 45' N and 7° 51' N and longitudes 6°41'E and 6°45'E. It is the administrative headquarters (Capital) of Kogi State situated at the confluence of the Niger and Benue rivers within the lower Niger trough with an estimated area of 63.82 sq. km (Figure 1). The status of Lokoja as an administrative headquarters of Kogi State brought some institutions like the Federal University, Lokoja, Kogi State Polytechnic, the Federal Medical Centre, Kogi State Specialist Hospital and a host of other institutions in the city. Lokoja is one of the ancient towns in Nigeria. The town assumed metropolitan status from pre-independence days, harboring many Nigerian ethnic groups. It is both the administrative and commercial capital of Kogi State, the most centrally located state in the country with a growth rate of 2.5%. By 1996, it had an estimated population of 49,258. The socio-political prominence of Lokoja dates back to the 18th century British exploration, culminating in the arrival of Williams Balfour Baikie to Lokoja in 1860. Lokoja has since been an important commercial settlement inhabited by liberated Africans, immigrant settlers and indigenous populations who were encouraged to move down the top of mount Patti. Thus, Lokoja was transformed from a transit trading point to a viable commercial centre for European firms in the early 1860's. The ancient town was originally ceded in 1841 to the British by the Attah [King] of Igala and was selected to be the first British Consulate in the interior (1860-1869) and subsequently, the Military headquarters for Sir George Goldie's Royal Niger Company (1886-1900). With this status, the town witnessed an upsurge

of diverse ethnic groups who settled in Lokoja to exploit the benefits acquired from European activities. Lokoja therefore, became a melting pot for a collection of diverse ethnic groups.

Lokoja's fame, however, began to decline in 1904 when its military headquarters status was moved to Zungeru, which was further north but was restored when Lokoja became capital of the British Northern protectorate and remained a convenient administrative town for the British colonial government after the amalgamation of Northern and Southern protectorate into one nation called Nigeria in 1914. The first Governor General, Lord Frederick Lugard therefore ruled the new nation of Nigeria from Lokoja. Formerly the capital of Kabba province, it was later a Divisional and Local Government Headquarter in Kwara State. Lokoja remained part of Kwara State up to 1991. During these periods, several layout plans were prepared to suit Lokoja's status and most of these plans were known as Town planning Schemes (TPS) or layout plans (LP). Preparation of the schemes was centered on areas known as Government Reserved Area (GRA), where most top government officials and Europeans lived. By the 27th of August 1991, the status of Lokoja was boosted when new states were created and Lokoja became the capital of the new Kogi state. This necessitated the enacting of an edict declaring Lokoja Metropolitan Area's, which this was put at 16km radius around the town centre marked by the General post office as the centre of the radius.

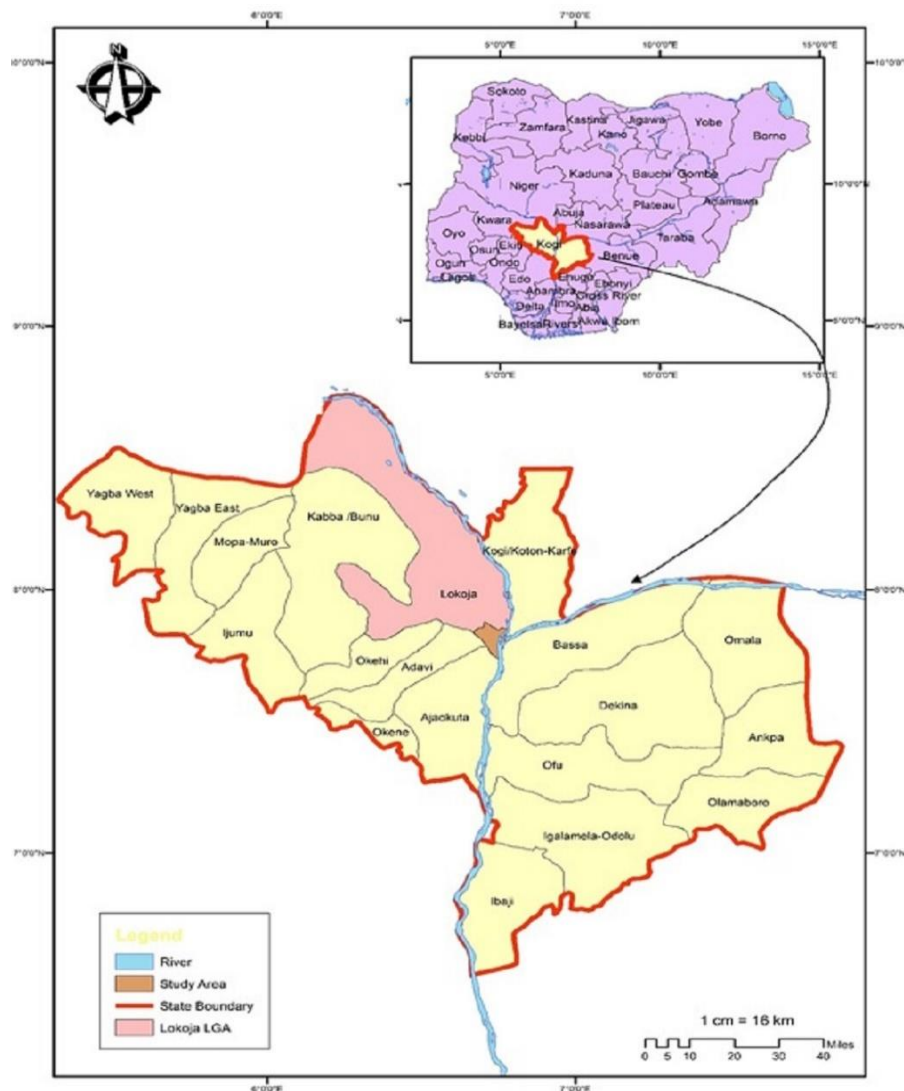


Figure 1 Map of Study area in the context of Kogi State, Nigeria (Source: Kogi State Town Planning Development Board)

Conceptual and Theoretical Framework

Concept of Vulnerability

Vulnerability is described by the International Strategy for Disaster Reduction (ISDR) (2004) as the conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. The concept explains which of the factors is more relevant to community vulnerability.

Veen & Logtemeijer (2005) broaden the concept of vulnerability to explain flood vulnerability from an economic point of view. Here, the vulnerability is characterized as a function of dependence, redundancy and susceptibility. Susceptibility is the probability and extent of flooding. Dependency is the degree to which an activity relates to other economic activities in the rest of the country. Redundancy is the ability of an economic activity to respond to a disaster by deferring, using substitutes or relocating. Redundancy is measured as the degree of centrality of an economic activity in a network. The more central an activity is, the less it encounters possibilities to transfer production and the more vulnerable it is for flooding.

What this implies is that particular neighborhoods of the cities, by their physical and social circumstances (exposure factors), are vulnerable to flooding. In many instances of urban flooding, the elements commonly at risk are usually the poor segment of the population, improperly or poorly built housing and civil engineering structures and public infrastructures. It is, therefore, essential to emphasize that no proper or effective flood control measures can be placed without first identifying elements that are vulnerable and the causes of their vulnerability.

Theory of resilience

In ecology, Holling (1973) introduces the term 'resilience' to describe observed ecosystem dynamics. It challenges the conventional ecological paradigm of equilibrium that assumes a predetermined stable state for every ecosystem, to which it eventually returns after a disturbance. Empirical studies show that some ecosystems never stabilize due to frequent disturbances. Multi-equilibria also exist when the ecosystem stabilizes after a disturbance but in a different state. It means the ecosystem is characterized by a different set of structures and processes, and returning to the previous ecosystem is extremely difficult if not impossible (Holling 1973, Scheffer et al., 2001). Building on the alternative paradigm of multiequilibria/ nonequilibrium, Holling (1973) defines resilience as the system's ability to absorb disturbances and still persist. This ecological resilience concept focuses on persistence, or remaining within the same regime defined by the same processes, structures, feedbacks, and identity (Walker et al., 2004).

The application of resilience theory to this study would help the populace and stakeholders in being proactive in the area of preparing strategic operational plans and programs which address risk and vulnerability. This phenomenon will, in turn, help policy makers, academics, and urban planner's to understand the likely causes of disasters (both man-made and natural) and how these issues can better be addressed. Since the theory of urban resilience embraces the concept of awareness, detection and avoidance, sensitizing the populace on the need to discourage building along waterways and indiscriminate solid waste disposals most especially in drainages in the study area. This is why the theory fits into this study.

2. METHODOLOGY

Cross sectional survey research design was adopted for the study while both primary and secondary data were sourced. Multi-stage sampling technique was adopted in which all the six communities (Adankolo, Felele, Ganaja, Lokongoma, and Sarkin Noma) affected by flooding were purposively surveyed. All the buildings that fell within 200 metres of the six flood affected communities were identified. The total number of buildings (2,018) were enumerated and 202 (10%) of the total buildings were taken for the study (Table 1). Issues that were considered included: Respondent's socio-economic characteristics, respondent's perceived number of flood occurrences in the study area, perceived impact of flooding on lives and infrastructure, level of household preparedness and diverse methods used in combating flood. Both quantitative (Logistic regression) and qualitative (FGD) techniques were used to analyze the data at $p \geq 0.05$ level of significance. The qualitative data were content analyzed.

Table 1 Sample Frame and sample Size and sampling procedure

Wards in Lokoja Rural	Housing Units	Sample size (i.e 10%)
dankolo	266	27
Felele	359	36
Ganaja	592	59
Lokongoma	159	16
Sarkin Noma	642	64
Total	2,018	202

Source: Author's Fieldwork, 2018

3. RESULTS AND DISCUSSIONS

Socio-economic characteristics

The main socio-economic characteristics considered in the study area include: gender, age, occupation, marital status, education status, income and household size, period of stay. Lokoja is comprised of five communities based on the total building in the area; Sarkin Noma community has the highest number, accounting for 31.7% of the sampled population. This was closely followed by Ganaja community taking 29.2%, and the remaining 60.9% was shared by Felele, Lokongoma and Adankolo communities. In general, from the study it was revealed that more than half of the population (52%) were male, implying the prevalence of male-dominated household head in the study area.

Educational status of the respondents reveals that 2% were uneducated, compared with 52.5% which had tertiary education. Meanwhile, the proportion of respondents without formal education was only found in Felele community accounting for 0.5%. Those with primary education accounted for 6.3% while the percentages of the respondents with tertiary education in Lokongoma, Felele, Ganaja, Sarkin Noma, and Adankolo were 6.4%, 15.8%, 31%, 15.3% and 1.5% respectively. The observed high level of literacy can be attributed to the fact that the first primary school in northern Nigeria was established in Lokoja, which influences the high level of literacy in the study area, thereby confirming the assertions that existence of educational institution influences literacy level (Ukaegbu 2011) (see table 2).

The study also reveals that 41.6% of the respondents were aged between 40 and 49 years, 21.3% were aged between 30 to 39 years; 14.9% were between the aged between 20 and 29 years, 8.9% were aged between 50 and 59 years, and 10.4% were aged 60 years and above, and the least percentages goes to people whose age fell between 15 to 20 years.

Furthermore, the study also reveals that in 32.2% of the respondents were civil servants, 19.8% were fishermen. The remaining 48% is made up of traders, students, artisans, retirees, unemployed and others. The variation across the settlements is presented in table 2. It can therefore be said that government establishment is the predominant employer of labour in Lokoja, which confirms the findings of Adetunji (2015) that major employer of labour in Nigeria is government.

In respects of the monthly income, investigation revealed that more than half (71.8%) of the respondents earned above the Nigeria minimum wage of ₦18,000 (i.e. N600 daily). The proportion of the respondents who earned above N100,000 monthly (i.e. N3,333.33 daily) were 1.5%, while 9.9% earn between ₦60,000 to ₦79,000 monthly (i.e. N2,000 – N2,633.33 daily) (see table 2). Meanwhile, there was a relative difference in numbers of respondents who earned between N20,000 to N39,000, in Lokongoma, Felele, Ganaja, Sarkin Noma and Adankolo accounting for 4.5%, 7.9%, 15.3%, 5.9% and 4.0%, respectively. It can be inferred therefore, that majority of the respondents which according to World Bank (2015) lived above poverty level of a minimum of \$1.90 (i.e. N693.5 daily) per person per day.

Moreover, the study reveals that 62.8% of the respondents had household sizes that ranged from 3 to 6, 13, and 9.0 % had household sizes that ranged from 7 to 9, while 22.8% had household sizes that ranged from 1 to 2. The least (0.5%) had above 10 persons per household. The highest number of household (3 to 6 person) was in Ganaja and Sarkin Noma which accounted for 21.9% and 17.9%, respectively. The observed high level of household size can also be attributed to polygamy nature of the respondents along with socio-cultural beliefs of the northern Nigeria, where the number of children determines the wealth of the people, though, eventually translate poverty (Anyanwu, 2014).

Table 2 Socio Economic Characteristics of the Respondents in the Study Area

Name of Community		Lokongoma	Felele	Ganaja	Sarkin Noma	Adankolo	Total
No. of Male	Pop.	10	12	33	36	14	105
	%	5	5.9	16.3	17.8	6.9	52
No. of Female	Pop.	17	24	26	28	2	97
	%	8.4	11.9	12.9	13.9	1	48
Name of Community		Lokongoma	Felele	Ganaja	Sarkin Noma	Adankolo	Total
Single	Pop.	6	6	15	6	5	38
	%	3	3	7.4	3	2.5	18.8
Married	Pop.	16	26	41	52	11	146
	%	7.9	12.9	20.3	25.7	5.4	72.3
Separated	Pop.	2	0	2	1	0	5
	%	1	0	1	0.5	0	2.5
Divorced	Pop.	1	1	1	1	0	4
	%	0.5	0.5	0.5	0.5	0	2

Widowed	Pop.	2	2	0	4	0	8
	%	1	1	0	2	0	4
Total	Pop.	27	36	59	64	16	202
Highest Educational Status		Lokongoma	Felele	Ganaja	Sarkin Noma	Adankolo	Total
No formal education	Pop.	0.0	1.0	0.0	0.0	0.0	1.0
	%	0.0	0.5	0.0	0.0	0.0	0.5
Primary	Pop.	1.0	1.0	9.0	2.0	0.0	13.0
	%	0.5	0.5	4.4	1.0	0.0	6.3
Secondary	Pop.	13.0	1.0	23.0	29.0	13.0	79.0
	%	6.3	0.5	11.2	14.1	6.3	38.3
Tertiary	Pop.	13.0	32.0	27.0	31.0	3.0	106.0
	%	6.3	15.5	13.1	15.0	1.5	51.5
Total	Pop.	27.0	36.0	59.0	64.0	16.0	206.0
	%	13.1	17.5	28.6	31.1	7.8	100.0
Age Group		Lokongoma	Felele	Ganaja	Sarkin Noma	Adankolo	Total
< 20	Pop.	5	0	1	0	0	6
	%	2.5	0	0.5	0	0	3
20-29	Pop.	1	7	14	3	5	30
	%	0.5	3.5	6.9	1.5	2.5	14.9
30-39	Pop.	5	6	14	17	1	43
	%	2.5	3	6.9	8.4	0.5	21.3
40-49	Pop.	11	20	19	24	10	84
	%	5.4	9.9	9.4	11.9	5	41.6
50-59	Pop.	3	1	8	6	0	18
	%	1.5	0.5	4	3	0	9
>60	Pop.	2	2	3	14	0	21
	%	1	1	1.5	6.9	0	10.4
Total		27	36	59	64	16	202
Occupation		Lokongoma	Felele	Ganaja	Sarkin Noma	Adankolo	Total
Trading	Pop.	1	1	17	14	0	28
	%	0.5	0.5	8.4	6.9	0	16.3
Retiree	Pop.	4	2	3	7	0	16
	%	2	1	1.5	3.5	0	8
Unemployed	Pop.	0	0	1	1	0	2
	%	0	0	0.5	0.5	0	1
Fishing	Pop.	1	1	17	11	10	40
	%	0.5	0.5	8.4	5.4	5	19.8
Lumbering	Pop.	0	0	1	0	0	1
	%	0	0	0.5	0	0	0.5
Farming	Pop.	3	0	0	3	0	6
	%	1.5	0	0	1.5	0	3
Civil Servant	Pop.	7	24	16	17	1	65
	%	3.5	11.9	7.9	8.4	0.5	32.2
Student	Pop.	4	0	0	1	2	7
	%	2	0	0	0.5	1	3.5
Sand mining	Pop.	0	0	2	3	1	6
	%	0	0	1	1.5	0.5	3

Artisan	Pop.	0	7	0	3	2	12
	%	0	3.5	0	1.5	1	6
Driver	Pop.	1	0	0	3	0	4
	%	0.5	0	0	1.5	0	2
Others (Specify)	Pop.	0	0	2	1	0	3
	%	0	0	1	0.5	0	1.5
Total		27	36	59	64	16	202

Name of Community		Lokongoma	Felele	Ganaja	Sarkin Noma	Adankolo	Total
No Income	Pop.	3	5	2	1	0	11
	%	1.5	2.5	1	1	0	6
< N 19,000	Pop.	2	2	1	9	0	14
	%	1	1	0.5	4.5	0	7
N 20,000-N 39,000	Pop.	9	16	31	12	8	76
	%	4.5	7.9	15.3	5.9	4	37.6
N 40,000-N 59,000	Pop.	9	11	19	22	8	69
	%	4.5	5.4	9.4	10.9	4	34.2
N 60,000-N 79,000	Pop.	2	2	4	12	0	20
	%	1	1	2	5.9	0	9.9
N 80,000- N 99,000	Pop.	0	0	2	7	0	9
	%	0	0	1	3.5	0	4.5
> N100,000	Pop.	2	0	0	1	0	3
	%	1	0	0	0.5	0	1.5
Total		27	36	59	64	16	202

Household size		Lokongoma	Felele	Ganaja	Sarkin Noma	Adankolo	Total
1-2	Pop.	3	19	10	12	2	46
	%	1.5	9.5	5	6	1	22.8
3-6	Pop.	18	14	44	36	14	126
	%	9	7	21.9	17.9	7	62.8
7-9	Pop.	6	1	5	16	0	28
	%	3	0.5	2.5	8	0	13.9
>10	Pop.	0	1	0	0	0	1
	%	0	0.5	0	0	0	0.5
Total		27	35	59	64	16	201

Source: Author's field survey, 2018.

Number of Flooding Occurrence Experienced by Respondents

Investigation on the number of flood occurrence experienced by respondents, reveals that 34.2% of the respondents experienced flooding just once comprising 2.0% in Lokongoma, and 0.5% in sarikin Noma; 36.6% experienced flooding twice comprising 5.0% in Felele, 9.0% in Ganaja, 6.0% in Sarikin Noma and 4.0% in Adankolo, while the proportion of students that experienced flooding thrice accounted for 20.3% comprising 22.3% both in Ganaja and Adankolo, 14.9% in Felele and 5.9 in Adankolo. (See table 3). The implication of this is that residents' experiences of flooding have a significant impact providing information relevant to flood preparedness.

Table 3 Number of flooding occurrence experienced by respondents

Neighborhood	Once		Twice		Thrice	
	Pop.	%	Pop.	%	Pop.	%
Lokongoma	4	2.0	3.0	1.5	2.0	9.9

Felele	0	0.0	5.0	2.5	30	14.9
Ganaja	0	0.0	9.0	4.5	45	22.3
Sarkin Noma	7	3.5	6.0	3.0	45	22.3
Adankolo	0	0.0	4.0	2.0	12.0	5.9
Total	11	5.5	27	13.5	152	75.3

Source: Author's field survey, 2018.

Resident's Perceived Impact of Flooding on Lives and Infrastructure

Furthermore, investigation on the perceived impact of flooding on lives and infrastructure reveals that 38.8% of the respondents had experienced household properties (such as electrical appliances, clothes, and food stuffs) damage comprising 4.5 % in Lonkongoma, 2.0% in Felele, 9.9% in Gnaja, as high as 12.4 in serikin Noma and 2.0 in Adankolo; 11.5% on vehicular damage comprising of 0.5% in lokongoma, 5.0% in Serikin Noma and 1.5% in Adankolo, 3.5% had part of the building damaged, comprising of 0.5% in lokongoma and 3.0% in serikin Noma. Other communities in the study area had no case of the part of their building collapsed. About 11.4% suffered a case total building collapsed, comprising 0.5% in Lokongoma, being the only one in the sampled communities. Regarding farmland, 7.0% of the respondents had their farmland and produce damaged, comprising of 2.5% in Lokongoma, 1.5% in Ganaja, 3.0% in Sarikin Noma. With respect to death on relations 2.0% were affected, comprising of 0.5 both in Lokongoma and Ganja. No impact of flooding on livestock was experienced in the study area (Table 4). In addition, it revealed during the FGD section by Mallam Sanusi, who stated that;

"This past flood event has affected our farmlands and its produce, our shops were damaged, buildings and the little means of survivor we had. We have to start from the scratch after the water recedes."

The implication of this is that the impact of flooding increases the level of poverty of its victims. This is in line with the findings of Dube, Mtapuri and Matunhu (2018), who found that a strong relationship exists between flooding and poverty because of the fact that flooding causes or worsens poverty, whereas poverty increases flood vulnerability.

Table 4 Respondent's perceived impact of flooding on lives and infrastructure

Name of Community	Household properties		Damaged vehicles		Damaged part of the building		Total building Collapse		Farmland		Death of relation		Livestock	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
Lokongoma	9	4.5	1	0.5	1	0.5	1	0.5	5	2.5	2	1	0.5	0
Felele	4	2.0	0	0	0	0	0	0	0	0	0	0	0	0
Ganaja	20	9.9	9	4.5	0	0	0	0	3	1.5	2	1	0.5	0
Sarkin Noma	25	12.4	10	5.0	6	3.0	0	0	6	3.0	0	0	0	0
Adankolo	4	2.0	3	1.5	0	0	0	0	0	0	0	0	0	0
Total	62	30.8	23	11.5	7	3.5	1	0.5	14	7.0	4	2.0	0	0

Source: Author's field survey, 2018.

Table 5 Household Preparedness for Flood Incidents

Name of Community	Pop.	%
Lokongoma	18	8.9
Felele	21	10.4
Ganaja	42	20.8
Sarkin Noma	60	29.7
Adankolo	15	7.4
Total	156	77.2

Source: Author's field survey, 2018.

Household Preparedness towards Flood Incidents

Meanwhile, study was also carried out on households' preparedness towards flood incidents. It was revealed that 77.2% of the respondents were prepared for flood incidents. Across the communities, 8.9%, 10.4%, 20.8%, 29.7%, and 7.4% were prepared for flood in Lokongoma, Felele, Ganaja, Sarkin Noma, and Adankolo, respectively (see table 5). This was also confirmed during the FGD when the representative of Lokongoma community, Mallam Salisu Yusuf, stated that:

"We were prepared for flood event, and this was because we received early warning of the impending flood from various sources which included the community-based organizations, radio and television set."

Level of Household Preparedness for Flooding in the Study area

Further investigation on the level of preparedness of the respondents for flooding in the study reveals that, of 77.2% of the respondents who were prepared for flooding, 32.1% just prepared a little, 36.0% were slightly prepared, 20% were moderately prepared, and 12.2% were very prepared. At the community level, 3.2% in Lokongoma were a little prepared, 4.5% of them were slightly prepared, 2.6% were moderately prepared, and 1.3% was very prepared. In Sarkin Noma, 13.5% of them were slightly prepared, while only 5.8% of them were very prepared (see table 6). This level of household preparedness was influenced by various social and demographic factors, a fact that agrees with the findings of Mabuku *et al.*, (2018).

Table 6 Household Preparedness for Flood Incidents

Name of Community	A little prepared		Slightly prepared		Moderately prepared		Very Prepared	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%
Lokongoma	5	3.2	7	4.5	4	2.6	2	1.3
Felele	7	4.5	7	4.5	4	2.6	3	1.9
Ganaja	12	7.7	16	10.3	10	6.4	4	2.6
Sarkin Noma	19	12.2	21	13.5	11	7.1	9	5.8
Adankolo	7	4.5	5	3.2	2	1.3	1	0.6
Total	50	32.1	56	36	31	20	19	12.2

Source: Author's field survey, 2018.

Diverse Methods Used in Combating Flooding in the Study Area

Furthermore, study was carried out on the diverse methods used in combating flooding in the study area. The study revealed that 86.63% had knowledge of one form of indigenous flood coping strategy or the other. Also, 55.9% had community meetings with traditional leaders to deliberate on the impending flood danger, 86.6% of the community had knowledge of whistles or trumpet being blown as a form of early warning when the water level was fast rising (see table 7). Meanwhile, 71.9%, 55.9% and 71.8% of the respondents engaged in filling up bags with sands used as a form of embankment, appeased some deities and engaged in village regrouping, respectively

In Lokongoma community, 6.3% of the respondents filled up sand bags to serve as embankments. 19.0% appeased some kind deities to secure their houses and lives against any future flooding. 0.6% was engaged in village regrouping and 10.9% had knowledge that when whistle or trumpet was being blown, there was an impending flood. In Felele, the findings were relatively the same, as 20% of the respondents filled up sand bags, 20.6% appeased some kind of deities, 7.4% were engaged in village regrouping, and 0.6% had knowledge of whistle or trumpet was being blown was a signal for an impending flood.

Also in Ganaja community, as 26.3% filled up sand bags, 29.7% appeased some kind of deities, 9.1% were engaged in village regrouping, and 4.0% had knowledge that when whistle or trumpet was being blown, there was an impending flood. In Sarkin Noma community, the research reveals that 9.1% of the respondents filled up sand bags, 18.9% appeased some kind of deities, and 8.0% had knowledge that when whistle or trumpet was being blown, there was an impending flood. There was no case of village regrouping of any kind.

And lastly, in Adankolo community, the research also revealed that 2.9% of the respondents filled up sand bags, 2.9% appeased some kind of deities, 2.9% were engaged in village regrouping, and 2.9% had knowledge that when whistle or trumpet was being blown, there was an impending flood (see table 7). During the FGD session, Mr. Sanusi said:

'We the flood victims do no benefit from the flood victim's camps provided by government. And this camp, are usually let out to non-victims all year round. And as of now there are no space left for us. The little space left, we were asked to pay N25, 000 to be admitted'.

The implication of this is that households tended to have the indigenous coping strategies necessary for flooding; however, they were inadequate.

Table 7 Diverse Methods used in Combating Flooding in the Study Area

Neighborhood	Filling up of sand bags		Appease to deities		Village regrouping		Blowing trumpet or whistles	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%
Lokongoma	11	6.3	19	10.9	1	0.6	19	10.9
Felele	35	20	36	20.6	13	7.4	1	0.6
Ganaja	46	26.3	52	29.7	16	9.1	7	4
Sarkin Noma	16	9.1	33	18.9	0	0	14	8
Adankolo	5	2.9	5	2.9	5	2.9	5	2.9
Total	113	64.6	145	83	35	20	46	26.4

Source: Author's field survey, 2018.

Hypothesis testing

In order to determine the relationship between level of household preparedness and effect of severe flooding on households, logic regression test was carried out (table 8). The level of household preparedness was the independent variable, while impact of severe flood on households was the dependent variable. The result of the analysis is presented in table 9 to table 11. The logic regression model was statistically significant: $\chi^2(4) = 31.48, p < .0005$. The model showed 24.6% (Nagelkerke R^2) of the variance in severe impact of flooding and correctly classified 67.3% of cases. Households that were slightly prepared for flooding were 1.857 times more likely to be more vulnerable to severe effects of flooding than households that are fully prepared.

Table 8 Crosstab of Variables used for Logic regression analysis

		Level of Household preparedness				
		Little prepared	Slightly prepared	Moderately prepared	prepared	Total
Was the damage caused by the flooding severe?	Yes	37 (49.3%)	28(37.3%)	5(6.7%)	5(6.7%)	75(48.1%)
	No	13(16.0%)	28(34.6%)	26(32.1%)	14(17.3%)	81(51.9%)

Source: Author's field survey, 2018

Table 9 Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	184.231 ^a	.184	.246

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Table 10 Classification

Observed		Predicted		Percentage Correct
		Yes	No	
Did past flood cause damage to your building and it infrastructures	Yes	37	38	49.3
	No	13	68	84.0
Overall Percentage				67.3

	Observed		Predicted		Percentage Correct
			Yes	No	
Step 1	Did past flood cause damage to your building and it infrastructures	Yes	37	38	49.3
		No	13	68	84.0
	Overall Percentage				67.3

a. The cut value is .500

Table 11 Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)		
							Lower	Upper	
Step 1 ^a	Very Prepared		25.816	3	.000				
	Moderately Prepared	-2.076	.613	11.477	1	.001	.125	.038	.417
	Slightly Prepared	-1.030	.586	3.092	1	.079	.357	.113	1.125
	A Little Prepared	.619	.714	.752	1	.386	1.857	.458	7.528
	Constant	1.030	.521	3.906	1	.048	2.800		

a. Variable(s) entered on step 1: Very Prepared.

4. CONCLUSION AND RECOMMENDATION

Flooding has a significant negative impact on the lives of the people. Therefore, prospective developers should be mandated by Kogi State Town Planning Development Board, Lokoja Area office, to submit not just building plan approval but also appropriate Site Flood Risk Assessment Report (SFRAR) alongside, prepared by registered town planners. This is because site-specific assessment will provide more details on the site risk and impact of the proposed development on the neighbourhood. If local planning documents and policies are clear about the local planning authorities' approach to flooding, individual planning applications should reflect this, both in terms of type of development proposed and any mitigation strategies (if in a flood risk area). Government and key stakeholders should help in opening up virgin lands that will direct development away from rivers and flood plains.

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