

**FLOODING CHALLENGES ON FOOD SECURITY AND COPING STRATEGIES FOR
COMMUNITIES AT SOME FLOOD PRONE AREAS OF BENUE STATE**

Sub-Theme: Drought and Flood Vulnerability Assessment and Food Security

BY

CAROLINE N. IGBO-UCHI, PhD

uchicaroline@gmail.com

Tel: 07064526636

Department of Geography

College of Education

Katsina-Ala, Benue State.

ABSTRACT

Flooding is one of the most common and destructive natural disasters which are getting worse due to climate change. Annually, during the peak of rainy season, communities close to rivers overflow their banks; destroying farmlands, aquatic farms, properties, infrastructural facilities and displacing thousands of residents, and businesses, thereby creating acute food insecurity and significant damages and disruptions in flood prone areas in Benue State. Despite this ugly reoccurring scenario, little is known about the coping strategies used by the residents when flooding occurs. Using mixed method, this article examines the coping strategies employed by households in Makurdi, Katsina- Ala, Guma and LGAs. 450 heads of households residing in these affected LGAs were systematically selected to fill in questionnaires, while key informants comprising of chiefs and representatives of flood management institutions were chosen for in-depth intervals. The findings reveals that the commonest coping strategies adapted were: temporary vacation of homes, transfer of relevant properties to neighbors and building of flood culverts and drainage channels. The study then recommends among other measures that, government should take proactive steps on adequate land use and watershed planning and there should be structural flood mitigation with physical structures.

Keywords: *Flooding Challenges, Food Security, Coping Strategies, Benue State.*

Introduction

Flooding is one of the most frequent, vulnerable and widespread disasters affecting life, livelihood and properties globally. It basically accounts for nearly more than half of all the natural disasters in both developed and developing nations of the world (UNISDR, 2012). In Nigeria, flood disaster frequently occurs. As such most states are experiencing increased distress from yearly flooding most often during the rainy seasons due to torrential and erratic rainfall (Aja and Olaore, 2014). Flood disaster in this country can be mainly attributed to anthropogenic cause which is being aggravated by poor urban planning and inadequate environmental infrastructure. The non- existence of Flood Risk Management (FRM) strategy or all-inclusive

flood risk maps in the country, for instance, is evidence that flooding issues are poorly attended to (Oladokun and Proverbs, 2016). For example, among other functions, the National Water Resources Policy of 2016 was established to issue early warnings for flooding and to enforce buffer zone laws among people residing in unapproved places (NEMA, 2010). In addition, the federal government of Nigeria, through the Ministry of Water resources, introduced 'The Blue Economy' in 2012 to address flooding and its related perils. Specifically, public education of residents in flood-prone areas and enforcement of building regulations were inducted under this agenda. The blue economy also aimed at providing drainage and flood control measures in urban communities (NEMA, 2010). The Environmental Sanitation Policy of the country also ensures that governmental bodies put in plans to restrict the creation of new slums, ensure efficient and effective management of drainage systems and promote private sector participation in flood control.

Despite the availability of the state policies to curb flooding, the country is struggling to lessen flood related hazards, especially in the urban zones. Research has shown that nine Local Government Areas (LGAs), including Makurdi metropolis in places like Akpehe, Achusa, part of Wurukum as well as other places in Guma, Katsina-Ala, Buruku and Agatu (LGAs) and others, get flooded during the rainy seasons. In 2012 and 2022 for example, heavy rains caused mayhem in several parts of the Makurdi Metropolitan Area as well as other LGAs, while more than 10,000 people became homeless within these abovementioned years.

The numerous benefits derived from river bodies have attracted many people to live in these places. These communities are very close to the Katsina-Ala- Benue rivers, as well as their distributaries like Yooyo, Dura, Amile U Kiriki and Amile U Tamen . Flooding has almost become an annual event in the communities because excessive rainfalls cause the rivers to overflow their banks to people's homes, but residents continue to live there for the economic gains of fishing and farming as the deposition of rich debris there usually makes the soils to be very fertile in the cultivation of swampy rice, sugar cane, fresh vegetables and other water loving plants.

Flooding as earlier mentioned, is a major risk to riverside populations and flood plains causing substantial impacts on the environment, including aquatic fauna and flora, river bank erosion and other aspects due to the infrastructure such as dams, pier, and lands as well as by poor development practices including riverside development, excessive cleaning, and encroachment upon water ways. Worldwide, there has been rapid growth in number of people killed or seriously impacted negatively by flood disasters. Indeed, the amount of economic damages affects a large proportion of people in low-lying coastal zones or other areas at risk of flooding and extreme weather condition. UN-Water (2011) explained that flood is seen to have caused about half of disaster worldwide and about 84 per cent disaster deaths in the world. Primary cause of flooding in many parts of the world according to the Action Aid (2006) is directly or indirectly related to rainfall in the catchment areas of the major river systems. The unpredictability of rainfall in recent times has caused untold hardship during the raining season.

Action Aid further highlighted that, flooding is not only related to heavy rainfall and extreme climatic events; it is also related to changes in the built up areas themselves. As a result, urban areas such as Lagos, Port Harcourt, Makurdi and even Kastina- Ala as well as other similar areas with the same environmental conditions in Nigeria has always present some risk of flooding when rainfall occurs. It is pertinent to note that prevailing uncoordinated and uncontrolled urban growth allows for buildings or infrastructure to be constructed that actually obstruct natural drainage channel thereby paving way to flooding whenever there is heavy downfall.

However despite the reoccurrences of flooding, little is known about the coping strategies by the communities in the event of severe flooding. It is therefore imperative to examine how people in these communities cope with flooding, so that, the findings can be factored into national policies and local strategies geared toward flood management. This article therefore assesses the coping strategies of households during flooding at some flood prone areas of Benue State.

The Study Area

Benue State lies in the middle belt region of Nigeria, east of lower Niger and south of the Benue River. The state is located within the co-ordinates $7^{\circ} 47'$ and $10^{\circ} 00'$ East, $6^{\circ} 24'$ and $8^{\circ} 8'$ North. The state is surrounded by six states, namely; Nassarawa to the North, Taraba to the North-East, Cross River and Ebonyi States to the South, Enugu to the South-West and Kogi to the West. There is also a short international boundary between and the state and the Republic of Cameroun to the South-East-East. The state covers an area of about 34,059 square kilometers with a population of about 4,219,244 million people in the 2006 National Population Census that are spatially spread across the state.

The main rivers are the Benue which is the second largest river in the Nigeria and Katsina-Ala. River Katsina- Ala is the major tributary, while there are a number of smaller rivers. Extensive flood plains along these rivers are characterized by widespread swamps and ponds which are utilized for dry season irrigation farming. Elsewhere, surface drainage is generally good. Though Benue State has high drainage density, many of the streams are seasonal. As well, the permanent water table in many parts of the state is very low and there is an acute water shortage in the dry season in some LGAs. That notwithstanding, the numerous rivers and streams which overflow their banks during the peak of the rainy season provide a great potential for irrigated agriculture, a source for fresh water fish and transportation to the local inhabitants.

Materials and Methods

Mixed cross-sectional design method was adopted in the study. This method was used because of the heterogeneous nature of the targeted population, which included heads of households and some state institutions like Benue State Emergency Management Agency and Urban Development Board. Therefore, questionnaires were used to gather data from the heads of households, in-depth interview guides were used to gather data from members in some state institutions like Benue State Ministry of water resources, while certain areas within the

communities were photographed. The data covered the coping strategies used by the residents during flooding, as well as the responsive adjustments employed in the aftermath. From a frame of 1377 heads of households, a sample size of 207 was scientifically determined for the quantitative aspect. Systematic sampling technique was used in selecting the heads of households. This technique required the calculation of sample intervals for each community (Table 1). This was done by dividing the number of households (h) of each community by the community's sample size (z). At each community, the first household was randomly selected and the sampling interval was used to select the subsequent heads of households. At Makurdi metropolis flood prone areas like Akpehe, Achusa, part of Wurukum for example, after the random selection of the first head of household, every seventh head of household was considered as a respondent. This procedure was repeated until the required sample assigned to each community was obtained. The sample size of each community was obtained by dividing the population of the households by the entire household population (1377) of the communities. The result was then multiplied by the sample size of 207 which is displayed in the following model:

Table 1. Sample size distribution for the selected communities holds (h)

	Number of house- Community	Sampling interval	Sample size (z)
Makurdi	333	7th	50
Katsina-Ala	667	7th	100
Gbajima	377	7th	57
Total	1377		207

Source: Benue Statistical Service office and authors construct (2023)

$$\frac{\text{Number of household}}{\text{Total number of households in the three Local Government Areas.}} \times 207$$

In addition to the quantitative study, three representatives of the LGAs, the Urban Development Board as well as Chiefs in these Local Government Councils formed the key informants for the in-depth interviews. Three field assistants who have first degrees in Geography were trained to help in the collection of data. The drafted questionnaire was pretested in order to check all uncertainties. Ten people were used for the pre-testing exercise at Akpehe, which is a severe flood prone area in Makurdi metropolis. The selection of this area was based on the fact that it is at the low sloppy area of River Benue and also experiences flooding whenever it rains copiously. Permission was obtained from the Urban Development Board authorities, Benue State Ministry of Water Resources, the Chiefs, and heads of households before the commencement of the fieldwork. Introductory letters from the Boards and Ministry were presented to the Chiefs and the institutional heads. Letters to the Chiefs were accompanied by drinks as custom demands.

After gathering the relevant data, the outcome was scrutinized to check out mistakes and the data were fed into the Statistical Product and Service Solution (version 16) software for analyses. Descriptive statistics in the form of frequencies and proportions were used to analyze the quantitative data as presented in cross tabulations and pie chart. The results from the in-depth interviews were categorized and described under themes (Table 3). Respondents were made aware of their voluntary participation, while anonymity and confidentiality in the collection and reportage of the outcomes were ensured. One of the challenges encountered was getting some heads of households to participate in the survey. This difficulty stemmed from the fact that some heads of households attended work or go to farm from Mondays to Saturdays. So, some of the data collection were done on Sundays when the majority were at home.

Results

Coping Strategies to Flooding

As shown in Table 2, the most common coping strategy used by the selected households was seeking temporary refuge (50%) from neighbors whose homes were relatively safe. Forty-four percent also transferred their important valuables such as electrical gadgets, clothing, mattresses, and documents to friends and relatives who lived on higher ground. About a quarter of the inhabitants also cleaned gutters (26%) or built flood steps (25%) to prevent their homes from getting flooded. The least cited strategy was the elevation of sites before building. About one out of thirty-three respondents (3.0%) used this strategy which involved the raising of the surface above flood level with either laterite or stones before putting up houses. This strategy was a precautionary way of adapting to unexpected flooding (Table 2).

Table 2: Community coping strategies to flooding.

Adaptation strategy	Makurdi (%)	Katsina-Ala (%)	Gbajimba (%)	All (%)
Elevate land before building	0 (0.0)	7 (100)	0 (0.0)	7 (3.4)
Rebuild destroyed houses with cement	23 (52.3)	11 (25.0)	10 (22.7)	44 (21.3)
Build flood steps	10 (19.2)	36 (69.2)	6 (11.5)	52 (25.1)
Self-constructed channels	2 (7.4)	25 (92.6)	0 (0.0)	27 (13.0)
Clear gutters	0 (0.0)	54 (100)	0 (0.0)	54 (26.1)
Placing sandbags and stone bags in flooded areas	2 (20.0)	5 (50.0)	3 (30.0)	10 (4.8)
Place valuables on shelves	9 (33.3)	16 (59.3)	2 (7.4)	27 (13.0)
Temporary seeking refuge	31(30.1)	39(37.9)	33(32.0)	103 (49.7)
Transfer valuables to neighbors	29 (31.9)	32 (35.2)	30 (33.0)	91 (43.9)

Source: *Fieldwork, 2023; N = total number of respondents in all communities; n= number of respondents who used specific strategies in each community.*



Figure 1b: Drainage channels in Wurukum area choked with refuse, silt and weeds; **Source:** *Fieldwork, 2023.*



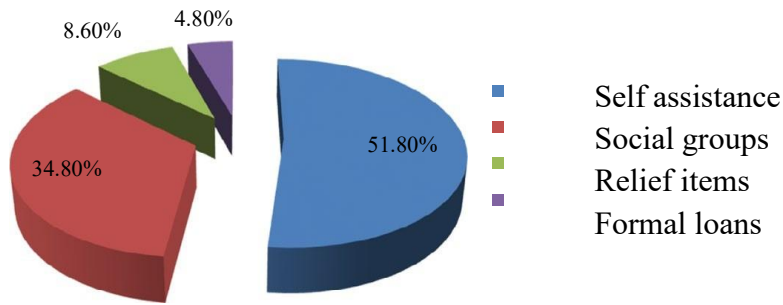


Figure 3: Responsive adjustments to floods; **Source:** *Fieldwork, 2023.*

The results further show that there were variations in the coping strategies adopted by residents of the three LGAs. Comparing the three LGAs, strategies such as elevating land before the building of houses and clearing of choked gutters were not seen at parts of Guma LGA, although seven in Katsina- Ala and 54 residents of Makurdi metropolis applied these methods respectively (Table 2). As indicated in Table 2, all the nine flood adaptation strategies were employed at Makurdi metropolis compared with Katsina- Ala and Guma LGAs. Clearing of choked gutters was a common coping strategy used in the Makurdi Metropolis because of the availability of numerous gutters. However, this strategy was assessed as ineffective because of poor waste disposal behavior within the inhabitants that live along the coastal lands of the study area (Figures 2a and 2b). The inhabitants of Makurdi metropolis (52%) was an outstanding LGA that practiced rebuilding of destroyed houses with cement, followed by Katsina –Ala Township (25%) and Gbajimba which is the headquarters of Guma LGA (23%). Comparing the three LGAs , 19 percent of the respondents who built flood steps to cushion the effects of flooding were from Makurdi metropolis whereas about 69 as shown in Table 2, the most common coping strategy used by the selected households was seeking temporary refuge (50%) from neighbors whose homes were relatively safe. Forty-four percent also transferred their important valuables such as electrical gadgets, clothings, mattresses and documents to friends and relatives who lived on higher grounds. About a quarter of the inhabitants also cleaned gutters (26%) or built flood steps (25%) to prevent their homes from getting flooded. The least cited strategy was the elevation of sites before building. About one out of thirty-three respondents (3.0%) used this strategy which involved the raising of the surface above flood level with either laterite or stones before putting up houses. This strategy was a precautionary way of adapting to unexpected flooding (Table 2).

The sources of resources for flood management within households were also studied. Figure 4 indicates that the commonest means by which residents recovered from flooding was self-assistance (52%), such as usage of personal savings to rehabilitate buildings. About 35 percent of flood victims said that friends and relatives (social groups) helped them to restore their losses, while less than a quarter (9%) resorted to relief items from Benue State Emergency Management Agency, Non-Governmental Organizations and churches (Figure 4). About one out of twenty (5%) also sought loans from banks and credit unions to restore their losses.

Institutional Responses to Flooding in the Study Area

Results from the research shows that Benue State Emergency Management Agency is the main institution mandated to address flooding issues within the communities. The Chiefs of these LGAs also had roles to play in managing flooding. However, none of them admitted to ever witness the sales of lands to the residents along the river banks. The Chiefs in particular, claimed that ownership of lands along the river banks is historical and occurred before they were born. When questioned about efforts made to help flood victims, representatives of this institution and the Chiefs opined that Benue State Emergency Management Agency is responsible for providing relief items to the victims, as well as announcing the dangers posed by an impending rainfall. However, it was discovered that the Chiefs occasionally organized the community youths to remove depositional debris from the rivers. The idea was to prevent an overflow of the rivers to the neighboring houses as the rainfall seasons approached. They also liaised with the government to educate the public about the dangers of living in flood-prone areas. As indicated in the results, the institutions were aware of their roles and the policies that mandated them to operate within the area. However, they pointed out that there were political, financial and attitudinal factors that inhibited their efforts to properly manage flooding within the communities. Besides, there are plans to build Kashimbilla/gamovo multipurpose dam, Ose Dam and hydropower project in Taraba state to accommodate any excess water flowing from Cameroun in the events of overflow. The dams are to serve as mitigation measures to flood disaster (Anugwara and Emakpe, 2013 cited in Jonathan *et al.* 2020).

Discussion

The various coping strategies used by the residents were meant to protect lives and properties. Based on the findings, the coping strategies employed by the residents can be categorized into three areas, namely, reactive, preventive and recovery. The reactive strategies can be explained as the immediate responsive measures used by victims to reduce the effects of flooding. The recovery strategies were meant to reclaim destroyed properties and assets, while the preventive strategies were employed to avoid the recurrence of flooding in the future. The findings show that the main reactive strategies used in times of flooding were seeking for refuge in flood-free settlements and transferring valuables to friends and relatives. Thus, the idea was to protect lives and properties, then, think of recovery strategies afterwards. This finding is in line with a study conducted by (Anugwara and Emakpe, 2013 cited in Jonathan, Owolabi, Olatunji, Duntoye, & Henshaw, 2020)) which discovered that affected families in areas inclined to flooding usually vacate their homes and move to camps or homes of friends and relatives. Clearing of blocked gutters, construction of flood steps, elevation of land before building and placing valuables on shelves were the main preventive tactics employed by residents in flood-prone communities. For instance people in flood prone environment like Lagos, Ibadan and Abeokuta have resorted to constructing their house with reinforced material and some buildings with more than one floor to protect their lives and belongings against flood. The social/organizational coping strategies are those activities and or social relationship and network among the community and local

government that can assist people in minimizing the consequences of flood. For example the distribution of relief materials and formation of refugee camps to cater for displaced persons until the flood subsides which is line with the study which was conducted by (Adedeji, Odufuwa & Adebayo, 2012). This is similar with the work which was done by (Simatele, 2010) as those affected by the flooding usually rebuilt their destroyed settlements with cement or placed sand bags in the flooded areas. This strategy corresponds with the coping mechanisms used by the people of Kalingalinga and Linda Compounds in Zambia.

With respect to the recovery strategies used by the flood victims, the majority recovered using self-supporting strategies. Many used their personal savings to repair damages occurred after flooding, while few admitted that friends and relatives were consulted for assistance in the event of flooding. Some of the support received from friends and relatives included assistance in the packing of belongings, cleaning of houses after flooding and offering of informal loans/food items. Receipt of relief items such as: bags of rice, blankets, mattresses, mosquito nets and roofing sheets from Benue State Emergency Agency and NGOs, as well as formal loans from banks and credit unions were not popular recovery strategies adopted by the residents, although a few admitted using such means. This echoes a similar study by Sakyi, 2013) which disclosed that only a few victims in the Pru District of Ghana received relief items from external sources after a flooding event. It was also discovered that collateral requirements and high interest rates prevented many flood victims from borrowing money from banks and credit unions to recover from their losses. This reflects on other studies in which poor households affected by flooding sometimes borrowed money and food from close associates instead of going for formal loans, (Nyakundi, Mogere and Mwanzo, 2010).

One other revelation from the study was that the coping strategies used by the respondents varied by their places of residence. For instance, strategies such as elevating the land before rebuilding and clearing choked gutters were not prevalent at Gbajima and Katsina- Ala towns, although such strategies were adopted by the inhabitants of Makurdi metropolis. Rebuilding of structures with cement was common among residents in all the LGAs. The implication is that, the strategies used within each community depended on the nature of land and available resources. This confirms the arguments of most scholars that due to variations in resources and vulnerability to flooding, adaptation requires place-specific strategies.

Although the various institutions supported the creation of drainage systems to allow the flow of water and the enforcement of building regulations especially in waterways, evacuation of the people at risk seems to be the ultimate panacea to the flooding problem. The mentality is to permanently prevent flooding from occurring, rather than using temporary reactive measures to cope with the flooding only to be faced with a similar problem in the next rainy season. However, the tentative politics of evacuating people from risky areas, coupled with inadequate resources to compensate for the losses was the main challenge. It needs to be mentioned that many residents were knowledgeable of the risk they faced, but continued to live in such unsafe areas because of

land affordability, easy land attainability and the quest to preserve ancestral lands. Questions can therefore be asked about the effectiveness of state policies to restrict people from living in life-threatening areas. As mentioned earlier, the country has well documented policies such as the Benue State Urban Development Board, the National Water Policy and the Environmental Sanitation Policy to check buildings in unauthorized and dangerous places.

However, gaps in the implementation of these policies have contributed greatly to the annual incidence of flooding in these flood prone areas. This gap emanates from the politics of none reinforcement of these laws when residents in risky areas need to be simply evacuated. The friction between government and people living in flood-prone areas as well as ‘weak’ implementation of the National Water Policy contributes to the flooding problem in the country. To curb the problem, this study recommends that local, state and national agencies that are saddled with the responsibilities of land allocations and urban and regional planning should intensify education to residents in the metropolis about the dangers associated with the construction of buildings along watercourses. The Urban Development Board should provide communal refuse containers at vantage positions for residents, to prevent people from disposing waste into the rivers and drains. The sensitization should be followed by a law enforcement system that punishes perpetrators. As a reactive solution, the Benue State Government should enlarge the drains to contain large volumes of water before the rainy seasons. Lands and Surveys as well as Urban Development Board should set up committees that will decide on issues relating to the acquisition of land permits in the metropolis. With this in place, land permits will be issued by the committees after thorough evaluation of lands. The State government in collaboration with the Security Agencies and other stakeholders like Urban Development Board should organize a demolition exercise in the metropolis after education and awareness campaigns against unlawful structures have been carried out. This should be done with compensation for the resettled people to avoid post-demolition discomforts.

Conclusion

As established in this study, flooding has debilitating effects on victims. Therefore, the implementation of measures aimed at reducing its impact on societies should not be ‘politicized’. Rather, the available policies and regulations should be well implemented, in order to save lives and properties, particularly in the wake of any impending disaster. It is conclusive that many coping strategies employed by victims deserve alterations. For instance, flood victims mainly coped with flooding by seeking refuge in others’ homes (50%) or transferring their valuables to them (44%). Others resorted to preventive strategies such as: construction of flood steps (25%), elevation of land before building (3%), clearing of blocked gutters (26%) and placing valuables on shelves (13%). Thus the majority of the flood victims used more reactive coping strategies than preventive, but such reactive measures are costly and sometimes ineffective. More efforts should be concentrated on devising preventive approaches to solving the flooding menace.

The study also shows that the type of coping strategies used by flood victims varied by geographical locations. Analyzing the findings carefully, the various stakeholders, including flood victims, contribute to the flooding menace. For example, though torrential and copious rains trigger flooding, some human activities such as dumping of refuse into river bodies greatly contribute to the problem. This could have been checked by proper enforcement of the Blue Economy and the National Water Policy, which have been ‘softly’ implemented. The study therefore serves as a basis for further research and debate into the strategies used by households affected by flooding. Future studies can look into details, the barriers preventing the implementation of the existing policies on flooding.

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