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# Coping Strategies Used by Flood Victims in Rural Households of Benue State, Nigeria


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## Abstract
*This study ascertained the coping strategies used by flood victims in rural households of Benue State, Nigeria. A multistage sampling procedure was used to select 130 respondents. Data collected through structured interview schedules were analysed using percentages, means and Chi-square. Results show that flooding has frequently occurred in the past five years. A higher percentage (80.8%) indicated a negative effect of flooding. Provision of boats to ease movement (89.2%), free infrastructure assistance like IDP camps (85.4%) and early warnings (83.8%) were interventions provided to cushion the effects of flooding. Moving valuable items, praying to God (99.2%), engaging in new income-generating activities (90.8%) and taking relief from organisations (90.0%) were the most utilised coping strategies. Most (75.4%) respondents had high utilisation of coping strategies. A significant relationship existed between superstitious belief ($\chi^2$=4.317, p=0.038) and the utilisation of coping strategies. The study concluded that flood victims relied mainly on the use of coping strategies. Prompt sensitisations from meteorological stations will help reduce the negative impact of flooding on households.*

## Introduction

Climate change is emerging as a global issue affecting so many sectors, reshaping ecosystems, impacting communities worldwide and causing threats to sustainable development (Turnwait, 2024). It makes people experience food and water scarcity, extreme heat, diseases, economic loss and increased flooding, especially in developing countries (Ifeanyi-obi et al., 2022).

A flood is a natural event or occurrence where a piece of land (or area) that is usually dry, suddenly gets submerged under water (Muhammad et al., 2023). Flooding may occur as an overflow of water from water bodies, such as a river, lake, or ocean, in which the water overtops or breaks levees, resulting in some of the water escaping its usual boundaries. Other causes of flood are heavy rainfall, absence of drainage channels, blockage of flood path, absence of vegetative cover, tsunamis and failure of dams among others (Jiriko, et al 2020). Floods accounted for nearly 90% of natural disasters, affecting nearly 3.2 billion people and causing an estimated US$300 billion in economic losses (Muhammad et al., 2023). Flood causes serious economic losses in various parts of the world (Olagunju, et al., 2021). The immediate effect of this natural disaster includes destruction of crops, loss of livestock, damage to properties, food insecurity and loss of lives among the affected communities (Shah et al., 2022). However, floods maintain the fertility of soils by depositing layers of silt and flushing salts from the surface layers. It also provide water for natural irrigation and fishing, both of which are important sources of protein in many developing countries.

The incidents of flooding in recent years have been devastating and continue to pose a serious challenge to food production, food security and livelihoods (Muhammad et al., 2023). In 2012, Nigeria had one of the worst flooding experiences in over forty years as a result of heavy rainfall that lasted several days causing floods to be experienced over three months period in that year. About 7.7 million people were affected with more than two million other people considered as internally displaced. More than 5,000 individuals suffered physical injuries along over 5,900 houses damaged; food crops were wiped away resulting in major threats to food security in the nation which Benue State was greatly affected (Jiriko, et al., 2020).

According to Ornguze, et al., (2023), flood disasters have damaged over 1.9 million hectares of land and reduced food production along flood plains. This has been a recurrent event, especially in flood-prone areas where farmers rely on rivers as a source of irrigation during the dry season but are faced with flood experiences during the rainy season. Also, Tajudeen et al., (2022) affirmed that the huge reliance of agriculture on rainfall alone is becoming even more precarious because of climate change. This suggests that the impacts of flooding in Nigeria continue to trigger concerns for food security and as well vulnerability of the households and communities (Turnwait, 2024).

Flooding and the means of addressing its challenges are issues of utmost concern (Awah, 2024). Serious damages from flood incidences and the vulnerability of rural smallholder farmers due to low capital have perpetually impacted negatively on their welfare and their ability to employ diverse adaptation and coping techniques. Hence, subsequent shock events are usually left to the government (Ajibade et al., 2019).

Benue State, being a region rich in agriculture, is the reason why it is referred to as the “food basket of the nation”. It is one of the states in the country that is worst hit by flooding. Farming is highly intensive in Benue State. Small-scale farmers utilise the available fertile farmlands for cultivating food crops such as yam, potatoes, guinea corn, soya bean, flax, cassava and beniseed. The state accounts for 70% of Nigeria’s soya bean production. Flooding occurred in different parts of Benue State in 1996, 2000, 2005, 2007, 2008, 2012 and 2022 which have been attributed to the release of water from the Lagdo dam in Cameroun and climate change (Ornguze, et al., 2023). The loss and sufferings that arise from these disaster events are raising critical questions regarding the continual exposure of Benue households to the risks of flooding among which are reasons dwellers are ill-prepared and the government ill-equipped to respond to the devastation from flooding effectively.

As flood emergencies in Nigeria have increased, there have been various studies that focus on the approach to understanding disasters. The studies have looked at the causes and effects of flooding situation in Nigeria, (Olagunju, 2021; Umar & Gray, 2022) but studies on coping strategies in Benue State where flood occurrence is on the rise presently have received little attention. A great deal of insight can be derived from how people react to changes caused by flooding. It therefore becomes imperative to investigate how households in such flood-prone areas are using different strategies to cope with this natural disaster. The specific objectives were to: (i) describe the frequency of occurrence of flooding in the last five years, (ii) ascertain the effect of flooding on rural households, (iii) examine interventions received to cushion the effects of flooding, (iv) examine the types of coping strategies used, (v) determine the utilisation of coping strategies and (vi) identify the factors limiting the utilisation of coping strategies towards flooding.

**Methodology**

The study was carried out in Benue State, Nigeria. The state has a projected population of about 6,141,300 (NPC, 2022) and an annual growth rate of 2.3%. It is located between longitudes $6^0$ 33’E and $10^0$E and latitudes $6^0$ 30’N and $8^0$ 10’N. It is administratively divided into three zones namely; Zone A (Eastern Zone), Zone B (Northern Zone) and Zone C (Central Zone) and has twenty-three (23) Local Government Areas.

Benue State was one of the worst hit states in the 2012 flooding disaster in Nigeria. The River Benue is a major river that passes through Benue State and has its origins in the Adamawa Plateau of Northern Cameroon. Along with other smaller rivers and tributaries, it experienced severe flooding that cut across all the major towns on the bank of the river and its tributaries. Affected communities in the state include Makurdi, Apa, Agatu, Otukpo, Guma, Buruku, Tarka and Katsina-Ala among others.

A multi-stage sampling procedure was used to obtain the sample size for the study. In the first stage, a Local Government Area (LGA) was purposively selected from each zone due to their flood exposure: Otukpo, Makurdi and Kastina-Ala. The second stage involved the systematic selection of 5% rural district from zone B which consists 40 rural districts and 10% rural district from zones A and C which consists 15 and 12 rural districts, respectively. This gives a total of 6 rural districts in the three LGAs, which are Otukpo central and Adoka from Otukpo, Itaje and Adakwe from Makurdi and Akume and Gbor from Katsina-Ala. Households were proportionately

selected to size from Otukpo Central (25), Adoka (22), Itaje (23), Adakwe (27), Akume (18) and Gbor (15) to give a sample size of 130 respondents. The population of the study comprises all rural households living in flood-prone areas of Benue State. The independent variables of the study are the frequency of occurrence of flood, effects of flooding on victims, interventions received to cushion the effects of flooding, types of coping strategies used and factors limiting the use of coping strategies in the study area.

The frequency of occurrence of the flood was measured by asking respondents to state how frequently they experienced a flood in the last five years by responding to 'often and not often'. Effects of flooding were measured using three domains of physical, economic and social effects which were operationalised using a three-point Likert-type scale of severe effect (3), moderate effect (2) and low effect (1) and the mean value of 41.7 used to categorise it into negative and positive effects. Furthermore, respondents were asked to respond to interventions received to cushion the effect of the flood. This was measured using a scale of yes and no with scores of 2 and 1 assigned, respectively.

Respondents were asked to indicate the types of coping strategies used like construction of floodway, local drainage, use of canoes, sandbagging around houses, and manual scoping of water among others. This was measured using a scale of yes and no and scores 1 and 0 were assigned, respectively. Also, factors limiting the use of coping strategies were measured using four domains: economic, cultural, environmental and religious factors which were operationalised on a three-point Likert-type scale of major (2), minor (1) and not a factor (0). The mean value for each domain was obtained and used to identify the most significant factor.

The dependent variable of the study is the utilisation of coping strategies. Respondents were asked to indicate the level at which they use different coping strategies which was measured using a scale of regularly (2), sometimes (1) and never (0). A mean value of 43.7 was used to categorise the respondents as having high or low levels of utilisation of coping strategies. Descriptive (mean, percentages, and frequencies) and inferential (Chi-square) statistical tools were used to analyse the data for this study.

## Results and Discussion

### Frequency of Occurrence of Flooding

Table 1 shows the occurrence of flooding in the past five years with 2019 (96.2%) and 2022 (100.0%) having the highest occurrence of flooding as indicated by the respondents. This implies that respondents had been experiencing flooding for more than five years which could have affected their lives, properties and livelihoods. This may also suggest that government efforts towards controlling floods in the study area are not encouraging, the reason the occurrence persists. This is in line with the findings of Ornguze, et al., (2023) that the occurrence of floods in Benue State has been consistent for over two decades and is expected to continue if proper measures are not taken by concerned stakeholders.

**Table 1: Frequency of occurrence of flooding in the last five years**

| Years | % |
|---|---|
| **Experience flooding in the last five years** | |
| **(**Yes) | 100.0 |
| **Frequency of occurrence** | |
| **2018** | |
| Often | 66.2 |
| Not often | 33.8 |
| **2019** | |
| Often | 96.2 |
| Not often | 3.8 |
| **2020** | |
| Often | 51.5 |
| Not often | 48.5 |
| **2021** | |
| Often | 50.8 |
| Not often | 49.2 |
| **2022** | |
| Often | 100.0 |
| Not often | - |

**Source: Field survey, 2023**

**Effects of Flooding**

From Table 2, some of the physical effects experienced due to flooding are the destruction of the road network ( $\chi$ = 0.87), destruction to lives and properties and release of toxic substances to the environment ( $\chi$ = 0.53), increase in household food insecurity ( $\chi$ = 0.61) and enhanced breeding ground for pests and diseases ( $\chi$ = 0.64). This suggests that flooding is harmful to humans, properties and the environment. It is also a threat to food security. This corroborates the study of Muhammad et al, (2023) that flooding caused the death of hundreds of people and the destruction of many homes and properties in Pakistan. Loss of farm animals and sources of livelihood ( $\chi$ = 0.60), sales of assets and valuable items ( $\chi$ = 0.59) and loss of farmlands and destruction of crops ( $\chi$ = 0.58) were the common economic effects of flooding which had serious economic impacts on the wellbeing and livelihood of the respondents. This means that rural households will find it difficult to make ends meet and even cater for their families because their source of livelihood is affected. This is in tandem with the result of Jiriko, et al., (2020) that flood is one of the causes of food insecurity, lower income, hunger and undernutrition in most affected households and communities in Nigeria.

Social effects as stated by the respondents are a change in livelihood activities ( $\chi$ =0.51), an increase in rural-urban migration ( $\chi$ = 0.50) and depression due to loss of loved ones and properties ( $\chi$ = 0.31). This implies that many of the affected persons may have to move to cities where there are limited jobs and opportunities, thereby affecting livelihoods. Respondents' mental health could also be affected which may later affect their health status because the rate at which individuals cope with stress and shocks differs. This is in line with the findings of French et al, (2019) that beyond the physical consequences of flooding like injuries and losses, the longer-term effect could be psychologically hurting their mental health. Also, Mbaye & Okara

(2024) affirmed that rural-urban migration is one of the immediate effects of flooding which increases urbanisation and leaves migrants and those left behind to face hunger, malnutrition and poverty. The table further established that 80.8% of the respondents were negatively affected by flooding. This suggests that floods have more harmful effects than benefits.

**Table 2: Effects of flooding**

| Effects | Mean scores | SD |
|---|---|---|
| **Physical effects** | | |
| Destruction of lives and properties | 0.53 | 0.21 |
| Destruction of road network | 0.87 | 0.33 |
| Pollution of drinking water and environment | 0.56 | 0.23 |
| Release of toxic substances to the environment | 0.53 | 0.21 |
| Increase in household food insecurity | 0.61 | 0.26 |
| **Economic effects** | | |
| Loss of farm animals | 0.60 | 0.27 |
| Loss of farmlands and destruction of crops | 0.58 | 0.24 |
| Loss of source of livelihood | 0.60 | 0.27 |
| **Social effects** | | |
| Changes in livelihood activities | 0.51 | 0.20 |
| Rural-urban migration increases | 0.50 | 0.22 |
| Depression due to loss of properties/loved ones | 0.31 | 0.18 |
| **Level of effect** | % | |
| Negative (31.0-41.7) | 80.8 | |
| Positive (41.8-51.0) | 19.2 | |

**Source: Field survey, 2023**

**Interventions Received to Cushion the Effects of Flooding**

The result on Table 3 reveals that respondents received interventions to ameliorate the incidence of flooding through different stakeholders. Some of the interventions were early warnings to reduce the impact of flooding (83.8%), provision of boats to ease movement (89.2%), emergency relief measures (74.6%), free medical assistance by Non- Governmental Organisations (NGOs) and government (66.2%) including infrastructure assistance e.g. IDP camps (85.4%). This implies that prompt interventions and sensitisations before flood incidents could reduce the negative impact of flood on households and communities. This is in tandem with the findings of Osuji, et al., (2023) that relying on climate information and forecasts is central to the reduction of disasters by rural households. Government, spiritual organisations and NGOs should be proactive in ensuring that the impact of floods is prevented or reduced as they provide several aid and relief measures to time. This corroborates with the submission of Ter-Mkrtchyan & Franklin (2023) that the involvement of different stakeholders is germane in preventing natural disasters which must involve members of the community, government, groups and organisations.

**Table 3: Interventions received to cushion the effects of flooding**

| Interventions | % |
|---|---|
| Early warnings to reduce the impact of flooding | 83.8 |
| Provision of boat to ease movement | 89.2 |
| Supplies of farm inputs like seedlings, fertilizers etc. | 37.7 |
| Preparing drainage and flooding team | 46.2 |
| Emergency relief measures | 74.6 |
| Rebuilding damage infrastructure | 31.5 |
| Free medical assistance from NGOs | 66.2 |
| Reconstruction of damaged road linking rivers | 33.8 |
| Reconstruction of bridges between rivers | 43.1 |
| Free infrastructure assistance to the homeless e.g. IDPs camp | 85.4 |

**Source: Field survey, 2023**

**Types of Coping Strategies Utilised**

Coping strategies utilised by respondents are shown in Table 4. Some of the strategies are sandbagging around houses (80.8%), use of canoes for transportation and blocking doorways to prevent floods from entering houses (89.2%), manual scooping of water (80.8%), engaging in new income-generating activities (90.8%), move or protect valuable items, believing and praying to God (99.2%) and taking relief from philanthropist, churches and NGOs (90.0%). This is in line with a similar study conducted in Ghana which established that few flood victims also depend on taking reliefs from NGOs and relatives (Fiasorgbor, 2018). This implies that most flood victims will have to look for ways by which they will survive during the flood which may be strenuous and difficult. Some of the strategies like manual scooping of water and sand bagging around houses is time consuming and demands a lot of effort that can be tiring. Also, believing and praying to God is a coping strategy that will be utilised especially when victims are religious as people tend to resort to fate in times of disaster and shock. This is in tandem with the findings of Straten & Ncube (2023) that flood survivors in a similar study in Kwazulu-Natal used praying to God as one of the strategies, believing that it is only God that can prevent the occurrence of flooding.

**Table 4: Coping strategies utilised by respondents**

| Coping strategies | % |
|---|---|
| Sand bagging around houses | 80.8 |
| Use of canoe for transportation | 89.2 |
| Manual scooping of water | 80.8 |
| Block doorways to prevent flood from entering houses | 89.2 |
| Relying on less expensive foods | 43.8 |
| Follow government laws and regulations | 79.2 |
| Spending money from savings | 92.3 |
| Engaging in new form of income generating activities | 90.8 |
| Move or protect valuable items | 99.2 |
| Move family to a safe place | 52.3 |
| Purchasing or borrowing food on credit | 53.8 |
| Borrowing money from moneylenders | 81.5 |
| Believing and praying to God | 99.2 |
| Relying on goodwill of friends, families and relatives | 90.8 |
| Take relief from philanthropist, churches and NGOs | 90.0 |

**Source: Field survey, 2023**

**Factors Limiting the Utilisation of Coping Strategies towards Flooding**

Table 5 reveals factors limiting the utilisation of coping strategies by respondents. For economic factors, embezzlement of funds for flood mitigation programmes ( $\chi$ = 2.75) and lack of funds by victims ( $\chi$ = 2.69) were found to limit victims in utilising coping strategies. This suggests that victims were aware of dishonesty in the appropriation of funds that were meant for flood mitigation programmes. Also, some of the coping strategies employed by respondents require funds for it to be actualised which may not be available due to their low level of income. This supports the findings of Atanga (2020) that leaders and government have a role to play in ensuring that bottlenecks are removed in the use of flood disaster risk management strategy so that floods will be reduced to the barest minimum.

Under cultural factors, respondents thought that flooding is expected ( $\chi$ =1.26) as it is a sign of annoyance or punishment from God ( $\chi$ =1.00), so some of the respondents were reluctant to explore coping strategies for reducing flood as they believe that it may not make much difference. This is in line with the study of Straten & Ncube (2023) that God controls nature and natural occurrences. Rural dwellers should be enlightened on the reality and causes of flooding through human activities rather than focusing on superstitions. Environmental factors limiting the utilisation of coping strategies is unbearable hardship ( $\chi$ =1.26) as a result of disruption in livelihood activities, low income and migration. Poor health ( $\chi$ =1.63) is also identified as another factor due to injuries and outbreaks of diseases that could result as a result of floods. Inadequate information from metrological stations on flooding is also an environmental factor affecting utilisation of coping strategies as this could aid prompt actions by respondents if it is done on time. The study by French et al., (2019) affirmed that health challenges could limit the ability to utilise coping strategies. Religious factors like praying to God ( $\chi$ =1.70) and seeing flooding as a

sign of end time ( $\chi$ =1.00) could hinder respondents from utilising appropriate coping strategies. Economic factor has the highest mean ( $\chi$ =2.27) overall, showing that it limits the utilisation of coping strategies more than cultural ( $\chi$ =1.17), environmental ( $\chi$ =1.44) and religious ( $\chi$ =1.40) factors.

**Table 5: Factors limiting the utilisation of coping strategies towards flooding**

| Factors | Mean | SD |
|---|---|---|
| **Economic factors ( $\chi$ = 2.27)** | | |
| Lack of fund by victims | 2.69 | 0.46 |
| Embezzlement of fund for flooding mitigation programmes | 2.75 | 0.52 |
| Decrease in population due to rural-urban migration | 1.83 | 0.41 |
| **Cultural factor ( $\chi$ = 1.17)** | | |
| Flooding is expected | 1.26 | 0.37 |
| It is a sign of annoyance from the gods | 1.00 | 0.32 |
| **Environmental factors ( $\chi$ = 1.44)** | | |
| Unbearable hardship | 1.26 | 0.37 |
| Poor health | 1.63 | 0.39 |
| Inadequate information from metrological stations on flooding | 1.85 | 0.42 |
| **Religious factor ( $\chi$ = 1.40)** | | |
| Praying to God is the only solution to Flooding | 1.70 | 0.40 |
| It is a sign of end time, nothing can be done | 1.00 | 0.32 |

**Source: Field survey, 2023**

**Utilisation of Coping Strategies against Flooding**

Table 6 reveals that the use of canoes ( $\chi$ =2.79), manual scooping of water ( $\chi$ =2.77), buying less expensive foods ( $\chi$ =2.81), sandbagging around houses ( $\chi$ =2.63), relying on God and praying ( $\chi$ =3.00), moving family and valuable items to a safe place and blocking doorways ( $\chi$ =2.77) were regularly utilised as coping strategies against flooding by respondents. Also, engaging in new forms of income-generating activities ( $\chi$ =2.29) and borrowing ( $\chi$ =2.00) were also utilised to cope with the effects of flooding. This is established by the report of Fiasorgbor (2018) that flood victims utilised several mechanisms to mitigate and reduce the effects of flooding. The table also shows that there was high (75.4%) utilisation of coping strategies among respondents. This suggests that respondents will do everything at their disposal to reduce the effect of flooding because they are the victims not minding the input from the Government.

**Table 6: Utilisation of coping strategies against flooding**

| Coping strategies | Mean | Standard deviation |
|---|---|---|
| Construction of flood ways/local drainages | 1.95 | 0.54 |
| Raising the foundation of new buildings above flood level | 1.00 | 0.00 |
| Use of canoes | 2.79 | 0.41 |
| Manual scooping of water | 2.77 | 0.42 |
| Sand bagging around houses | 2.63 | 0.62 |
| Relying upon less expensive foods | 2.81 | 0.39 |
| Take relief items from Philanthropist | 1.69 | 0.61 |
| Rely on goodwill of families, friends and neighbours | 1.89 | 0.55 |
| Rely on God and pray | 3.00 | 0.00 |
| Buy flood insurance | 1.00 | 0.00 |
| Purchasing or borrowing food on Credit | 2.61 | 0.65 |
| Follow government laws and Regulations | 2.22 | 0.50 |
| Plant more trees | 1.00 | 0.00 |
| Spending money from savings | 2.77 | 0.42 |
| Borrowing from money lenders | 2.00 | 0.47 |
| Engaging in new form of income generating activities | 2.29 | 0.49 |
| Block doorways | 2.77 | 0.42 |
| Move myself and family to a safe Place | 2.77 | 0.42 |
| Move or protect valuable items | 2.77 | 0.42 |
| **Level of utilisation of coping strategies** | **%** | **Scores** |
| Low | 24.6 | 33.0-43.6 |
| High | 75.4 | 43.7-50.0 |

**Source: Field survey, 2023**

Table 7 shows that there was a significant relationship between superstitious beliefs ($\chi^2$=4.317) and the utilisation of coping strategies against flooding. This implies that superstitious beliefs could hinder or aid the utilisation of coping strategies. Individuals who hold tight to their superstitions may not explore the possibility of using any coping strategies against flooding as it is seen as a natural occurrence as supported by Straten & Ncube (2023).

**Table 7: Dependence of utilisation of coping strategies on personal characteristics**

| Variables | $X^2$ |
|---|---|
| Sex | 1.251 |
| Superstitious beliefs | 4.317 |
| Membership of association | 0.101 |

**Source: Field survey, 2023**

## Conclusion and Recommendations

Coping strategies utilised were sandbagging around houses, manual scooping of water, engaging in new income-generating activities and praying to God. Lack of funds by victims, embezzlement of funds for flood mitigation programmes and inadequate information from metrological stations were factors limiting utilisation of coping strategies. Prompt sensitisations from meteorological stations will help reduce the negative impact of flooding on households. Funds should be properly utilised for flood mitigation programmes in affected flood prone communities.

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