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Impact of flooding on agricultural communities in Benue State, Nigeria: A Comprehensive examination of income, livelihood stability, and food security

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Abstract
Floods pose a significant threat to urban agriculture, food production, food prices, and the nutritive and microbial quality of harvested food materials, serving as a critical driver of food insecurity and malnutrition. This precipitates migration and community conflict, hindering the government's ability to function effectively in affected areas. The problem statement underscores the vulnerability of these communities to flood-induced disruptions. This study examined the ramifications of flooding on agricultural communities in Benue State, Nigeria, focusing on income, livelihood stability, and food security. Employing a cross-sectional design, using the Taro Yamane (1967) sample size formula, data were collected from 400 farmers in flood-prone areas of Makurdi Local Government Area. Findings reveal significant negative impacts on income, livelihood stability, and food security, exacerbated by recurrent flooding. Recommendations emphasize the urgent need for comprehensive flood mitigation strategies, including early warning systems, improved infrastructure, and diversified livelihood options, to enhance resilience and mitigate the adverse effects on agricultural communities in Benue State.

Keywords: flooding, agricultural communities, Benue State, Nigeria, income, livelihood stability, food security

Introduction

Flooding in Benue State, Nigeria, poses a significant threat to agricultural communities, impacting income, livelihood stability, and food security. This issue has been extensively studied, revealing the severe consequences faced by farmers and rural households. In Benin City, Nigeria, seasonal flooding has been observed to inundate physical infrastructure and agricultural lands, causing substantial damage to farming activities such as fish farms, piggery, crops, and poultry (Butu, Emeribe, & Ogbomida, 2019) [3]. These floods not only result in direct losses of food stocks but also contribute to increased incidences of diseases among affected individuals (Butu, Emeribe, & Ogbomida, 2019) [3].

Similarly, in Imo State, Nigeria, farmers have reported adverse impacts of climate change on agriculture, including higher temperatures, reduced crop yields, and more frequent flooding incidents (Chikaire, Tijjani, & Abdullahi, 2016) [4]. The lack of awareness about agricultural insurance further compounds the risks faced by farmers, underscoring the necessity for interventions to enhance their resilience and mitigate the effects of climate change on their livelihoods (Chikaire, Tijjani, & Abdullahi, 2016) [4]. These findings highlight the vulnerability of agricultural communities in the region and the urgent need for effective strategies to address these challenges.

Climate change-related disasters, particularly excessive rainfall leading to flooding, have been identified as significant threats to household food security in rural farm households in Imo State, Nigeria (Kanu & Onyekwere, 2024) [5]. These disasters have prompted households to adopt various mitigation strategies, including changes in farming practices, irrigation methods, and crop replacement, to cope with the adverse effects of climate change (Kanu & Onyekwere, 2024) [5]. However, government intervention is crucial in implementing long-term solutions to mitigate the impact of flooding on agricultural communities.

To address the impact of flooding on agricultural communities in Benue State, Nigeria, comprehensive strategies are urgently needed. These strategies should focus on enhancing resilience, promoting climate-smart agricultural practices, and integrating local knowledge and institutions into adaptation efforts. One key aspect of these strategies involves improving drainage and irrigation systems to better manage floodwaters and minimize damage to agricultural lands. Establishing community weather forecast centers can also help farmers anticipate and prepare for extreme weather events, including floods.

Furthermore, providing subsidies for fertilizers and other inputs can support farmers in adapting to changing climatic conditions and maintaining agricultural productivity. Additionally, raising awareness about agricultural insurance and facilitating access to insurance schemes can help farmers manage risks associated with flooding and other climate-related hazards.

Moreover, integrating indigenous knowledge and traditional practices into adaptation efforts can enhance the effectiveness and sustainability of interventions. Local communities often possess valuable knowledge about climate patterns, soil types, and traditional farming techniques that can inform climate resilience strategies.

In conclusion, addressing the impact of flooding on agricultural communities in Benue State, Nigeria, requires a multifaceted approach that encompasses both short-term and long-term measures. By implementing comprehensive strategies that enhance resilience, promote climate-smart agricultural practices, and integrate local knowledge and institutions, stakeholders can safeguard income, livelihood stability, and food security in the face of climate change challenges. This holistic approach is essential for building adaptive capacity and ensuring the sustainability of agricultural livelihoods in flood-prone regions.

Statement of the problem

Flood poses a significant threat to urban agriculture, food production, food prices, and the nutritive and microbial quality of harvested food materials. It serves as a critical driver of food insecurity and malnutrition, precipitating migration and community conflict, thereby hindering the government's ability to function effectively in affected areas. Among the notable effects of flooding on human health are chemical injuries and the exacerbation of water-borne diseases such as typhoid fever, cholera, leptospirosis, and hepatitis. Additionally, floods exert a substantial influence on vector-borne diseases, including malaria, dengue, yellow fever, and West Nile fever.

It’s against the backdrop that this study examined Impact of Flooding on Agricultural Communities in Benue State, Nigeria: A Comprehensive Examination of Income, Livelihood Stability, and Food Security

Objective of the Study

The study examined Impact of Flooding on Agricultural Communities in Benue State, Nigeria. In specific, this study seeks to:

1. Assess the Economic Impact of Flooding on Agricultural Communities.
2. Evaluate the Impacts of Flooding on Livelihood Stability and Food Security.

Conceptual Review

Flooding

Flooding refers to a condition in which a dry land area is covered by water resulting from excessive rainfall, overflow of rivers/dams, the dam burst, blockade of waterways, earthquake/tsunamis, high tide and protective release of water from dams. Flooding is a temporary condition of partial or complete inundation of normally dry areas from overflow of inland/tidal waters or unusual and rapid accumulation/runoff. The effects of natural hazards such as floods can be felt at the micro and macro levels, affecting communities, neighbourhood, drainage basins and large sparse of land. Climate change and variability from anthropogenic activities have significant influences the elements of weather and climate comprising heavy and concentrated precipitations; environmental woes consisting of indiscriminate disposal of refuse in drainages and waterways, bush burning and destruction of vegetal cover, excessive cultivation and grazing activities are among the factors intensifying the occurrence of flooding in globally.

Flood is a major threat to urban agriculture, food production, food prices, and the nutritive and microbial quality of harvested food materials. It is the critical driver of food insecurity and malnutrition that induces migration and community conflict, which prejudices the capability of the government to function effectively in the affected areas. Among the significant effects of the flood on human health are their chemical injury and the worsening of water-borne diseases such as typhoid fever, cholera, leptospirosis, and hepatitis. Flood has a significant influence on vector-borne diseases, including malaria, dengue, yellow fever, and West Nile fever. Emphasized the high incidences of diseases, such as influenza, tuberculosis, typhoid fever, dysentery and malaria, and higher health expenditures among fishers during flooding periods.

Flood is among the most devastating natural disaster in Nigeria since the 1980s. The 2012 floods in Nigeria affected 27.9% of yam, 21.6% of cassava, 17.2% of sweet potato, 31.4% of rice, 20.1% of maize, and 14% of sorghum-producing areas of Benue Trough. One of the significant effects of the flood on farming communities and farmers is the decline in environmental quality, an outbreak of diseases, crop failure, and damage of seeds and loss of livestock.

These impacts together have resulted in rural-urban migration in many communities, leading to a decline in agricultural labour, reduction in food production and decrease in household income, which trigger hunger and starvation. This study aimed to valuate urban Agriculture vulnerability to flooding in Makurdi, Benue State, Nigeria. As the Nation’s food basket, Benue state is the major sources of yams, sorghum, millet, rice, cassava, shea nuts, sesame oil, peanuts (groundnuts), soybeans, and cotton to other parts of Nigeria. These agricultural products were grown by the Tiv, Idoma, Igede and other minorities’ settlers. Over the recent years, flood disaster among farm families in Benue State, Nigeria is a recurrent annual event with implication on food security, high level of poverty, low levels of human and physical capital, and poor infrastructure.

Agriculture

Agriculture, a ubiquitous and essential human activity, plays a vital role in shaping societies and economies. Despite its

pervasiveness, the conceptualization of agriculture has proven to be elusive, with scholars grappling to provide a definitive definition. Point out the lack of a clear-cut definition for agriculture, signaling the complexity associated with encapsulating this multifaceted practice within a singular conceptual framework.

Over time, the understanding of agriculture has evolved, giving rise to various qualifying and competing terminologies such as traditional, appropriate, alternative sustainable, and modern or conventional agriculture. This evolution reflects the dynamic nature of agriculture as it adapts to changes in time and space. As well as argue that, unfortunately, the conceptualization of agriculture has often been confined to the explication of its subfields rather than addressing it as a holistic activity.

In an attempt to bring clarity to the definition of agriculture, embarked on a treatise, encouraging fellow scholars to contribute explicit definitions to the concept. However, their efforts culminated in a noteworthy observation – the absence of a definitive definition, as they resorted to citing a dictionary rendition. This underscores the difficulty in encapsulating the diverse facets of agriculture within a single, all-encompassing definition.

Despite the challenges, some scholars have ventured into defining agriculture in their own terms. Provide a broad definition, conceiving agriculture as the cultivation of both plants and animals to meet human needs. This definition emphasizes the fundamental role agriculture plays in sustaining human life by producing food and other essential resources. Echoes a similar sentiment, defining agriculture as man's systematic cultivation of useful plants and livestock. Both definitions highlight the integral relationship between agriculture and human livelihoods.

These conceptualizations shed light on the multifaceted dimensions of agriculture, emphasizing its crucial role in meeting human needs and shaping the environment. The common thread running through these definitions is the acknowledgment of agriculture as a deliberate human activity that involves the cultivation of plants and the rearing of animals. Additionally, they recognize the dual purpose of agriculture – serving as a means of sustenance for communities and as an economic endeavor.

Income, Livelihood Stability, and Food Security

Income, livelihood stability, and food security are interconnected concepts that play crucial roles in determining the well-being and quality of life of individuals and communities. Understanding these concepts and their relationships is essential for addressing poverty, inequality, and hunger on both local and global scales.

Income: Income refers to the money earned or received by individuals or households through various sources such as employment, investments, or government assistance. It serves as a primary determinant of people's ability to access goods and services necessary for their well-being, including food, shelter, healthcare, and education. Adequate income levels are essential for meeting basic needs and achieving a decent standard of living. Insufficient income can lead to financial hardship, limited access to essential resources, and increased vulnerability to economic shocks.

Livelihood Stability: Livelihood stability encompasses the ability of individuals or communities to sustain their means of living over time. It involves securing reliable sources of income and maintaining economic activities that provide for their needs and aspirations. Livelihood stability is influenced by various factors such as access to employment opportunities, market conditions, natural resources, social support networks, and government policies. A stable livelihood enables individuals to withstand economic uncertainties, cope with shocks and stresses, and pursue long-term development goals.

Food Security: Food security exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. It encompasses four dimensions: availability (adequate food supply), accessibility (physical and economic access to food), utilization (appropriate use of food to meet dietary needs), and stability (consistent access to food over time). Food insecurity arises from various factors such as poverty, inadequate infrastructure, conflict, natural disasters, and environmental degradation. It undermines human health, productivity, and well-being, perpetuating cycles of poverty and vulnerability.

The interplay between income, livelihood stability, and food security

Adequate income levels are essential for purchasing food and meeting other basic needs. However, the relationship between income and food security is not linear. Even with sufficient income, individuals may still experience food insecurity due to factors such as high food prices, limited access to markets, or inadequate food distribution systems. Conversely, improvements in food security can enhance income-generating opportunities by promoting health, productivity, and economic resilience.

Livelihood stability contributes to food security by enabling individuals to sustainably produce or procure food over time. Stable livelihoods provide the foundation for agricultural production, employment, trade, and other economic activities that support food systems. Conversely, food insecurity can undermine livelihoods by reducing productivity, increasing health care costs, and limiting educational and employment opportunities, perpetuating cycles of poverty and vulnerability.

Addressing the challenges of income inequality, livelihood instability, and food insecurity requires comprehensive strategies that address underlying structural factors, promote inclusive economic growth, strengthen social protection systems, enhance agricultural productivity and resilience, and empower individuals and communities to secure their livelihoods and food sovereignty. Collaboration among governments, civil society organizations, the private sector, and international partners is essential to achieve sustainable development goals and ensure the well-being and dignity of all people.

Empirical Review

Economic Impact of Flooding on Agricultural Communities

Floods have become a recurring nightmare for agricultural communities in Benue State, Nigeria, echoing similar challenges faced in other regions of the country like Benin City and Imo State. These devastating natural disasters inundate physical infrastructures, swallow vast swathes of agricultural lands, and wreak havoc on various farming ventures including fish farms, piggeries, snail farms, crops, and poultry. The repercussions are profound, inflicting substantial economic losses on farmers, who often find them grappling with depleted food stocks in the aftermath of floods

(Butu, Emeribe, & Ogbomida, 2019) [3].

The inundation of agricultural lands has been a persistent issue in Benue State, with floods causing extensive damage to crops, livestock, and infrastructure. The fertile lands, once teeming with productivity, are transformed into waterlogged wastelands during flood events. As a result, farmers not only suffer immediate financial setbacks but also face long-term challenges in restoring their lands to their former fertility levels. The loss of crops and livestock not only impacts the income of farmers but also disrupts the local food supply chain, leading to potential food shortages and price hikes in the region.

Moreover, the adverse effects of flooding extend beyond economic losses, significantly impacting the health and well-being of affected communities. The stagnant waters left in the wake of floods become breeding grounds for disease vectors, leading to a surge in illnesses such as diarrhea, malaria, and respiratory infections. The contamination of water sources by high fecal coliform counts further compounds the health risks, exacerbating the already precarious conditions for individuals residing in flooded areas (Butu, Emeribe, & Ogbomida, 2019) [3].

Addressing the multifaceted challenges posed by floods requires a holistic approach encompassing effective disaster preparedness, robust post-disaster management mechanisms, and the implementation of community-based adaptation models. Proactive measures such as early warning systems, flood-resistant infrastructure, and sustainable land use practices can help mitigate the impacts of floods and enhance the resilience of agricultural communities. Furthermore, empowering local communities through education, capacity building, and access to resources can foster adaptive strategies that enable them to cope with the recurrent threat of flooding (Butu, Emeribe, & Ogbomida, 2019) [3].

Floods continue to pose a significant threat to the livelihoods of agricultural communities in Benue State, Nigeria, mirroring similar challenges observed in other parts of the country. The detrimental effects of flooding extend beyond economic losses, encompassing health risks, livelihood disruptions, and food insecurity. Addressing these challenges requires concerted efforts at the local, national, and international levels to build resilience, enhance adaptive capacity, and safeguard the well-being of vulnerable populations in flood-prone areas. By investing in proactive measures and community-driven solutions, it is possible to mitigate the adverse impacts of floods and foster sustainable development in agricultural communities across Benue State and beyond.

Butu, Emeribe, & Ogbomida,(2019) [3] investigated the effects of hydrologically induced environmental problem in Benin City and how communities (considered as non-state actors) can be sustainably integrated/participate in monitoring of environmental change, disaster preparedness, post disaster management mechanisms and influence water resources development/management decisions. The study focused on the seasonal flood events of years 2016 and 2017. The study showed that the impacts of flooding in Benin City ranges from submergence of physical infrastructures, loss of agricultural lands/ farms. Using the Focused Group Discussion and Interview methods, 61.9% of flood affected persons agreed that their houses were submerged, 80.5% indicated that their farms, including fish farms, piggery, snail farms, crops and poultry were damaged by floods, 9.6%, indicated having experienced food stock losses due to floods. Most common diseases/sicknesses experienced were diarrhoea (27%), malaria (37%); cough (20%), while sickness due to snake bite was the least (4%). Fe and fecal coli form count values were high during seasonal flood event. Most of the hydraulic regulation projects have failed mainly due to poor feasibility study, inadequacy of hydrological data, non-involvement of relevant stakeholder and the complete absence of community based groups during engineering construction works. The study proposed a State-Non-state actors Integrated Model, which will be registered as a Corporate organization to plan and monitor environmental changes relating to climate change, flood and gully erosion disasters and with the active involvement of NEMA, SEMA, LEMA and other related agencies and NGO. Depending on the size of each Local Government Area in Benin, the proposed committee will comprise of 25-50 members. The study recommends capacity building of members in the form of training and re-training in the areas of early warning, preparedness, adaptation, emergency plan, data collection method/analysis, writing of research grants proposals to fund the activities of the committee and monitoring for environmental changes.

Chikaire, Tijjani, & Abdullahi, (2016) [4] analyzed rural farmers' perception, awareness and use of agricultural insurance as a hedge against climate change. Multistage sampling technique was used to select 300 farmers from 12 communities from the study area. Data were collected with the aid of questionnaire and analyzed using descriptive statistics such as mean scores and percentages. Results indicated that the mean age of respondents was 55.2years, with 62.3% married, while 61.7% had attended secondary school. The mean household size was 8.7, mean farm size (2.2 hectare), and mean farming experience was (38.6 years). Majority of the famers (84.%) had no access to extension services, whereas 78.3% belonged to some social organizations. It was observed that, there were increased in temperatures (98%) with resultant reduction in crop yield (9.59), increased in flooding (100%) incidences. Majority of the farmers (87.3%) were not aware of the agricultural insurance opportunity but 75% had indicated interest if they can access it. The famers agree that provision of insurance to them would reduce risk and setbacks, cushion shock arising from losses, increase credit worthiness and reduce vulnerability as well. It was recommended that extension personnel be sent to educate the respondents, training and enlightenment them on possible ways that will improve their productivity and welfare.

Kanu & Onyekwere (2024) [5] investigated the perception of climate change-related disasters and their impact on household food security in rural farm households in Imo State, Nigeria. Studies have consistently shown an association between climate change and food insecurity in different parts of the world. However the impact of climate change varies over time and space and therefore cannot be generalized. If household food security is to be secured in Imo State, it becomes imperative to identify the specific climate change related disasters that adversely affect household food security as well as the intervention priorities in specific communities. The study utilizes descriptive analytical tools to analyze the data from 186 farm households across four agricultural communities in the state. Findings reveal that excessive rainfall leading to flooding is the most prevalent climate change-related disaster, followed by excessive heat and irregular rainfall patterns. A significant

majority of respondents attribute household food insecurity to these climate change-related disasters at high or very high levels. Various mitigation strategies adopted by households include changes in farming practices, irrigation methods, crop replacement, and land modification techniques. The study also identifies top priorities for government intervention as improving drainage and irrigation systems, establishing community weather forecast centers, and providing fertilizer subsidies. Additionally, enhancing hedging technology and pest/disease control strategies were recognized as important interventions. The study emphasizes the importance of tailored interventions, continuous data collection, and awareness campaigns to enhance agricultural resilience and ensure food security in the face of climate change impacts.

Impacts of Flooding on Livelihood Stability and Food Security

The agricultural landscape of Benue State, Nigeria, is characterized by the cultivation of a variety of crops, each playing a crucial role in ensuring food security and livelihoods for its inhabitants. Highlight the significance of crops such as maize, rice, sorghum, yam, millet, groundnut, beans, and cassava in the agricultural practices of the state. These crops are not only essential for subsistence but also contribute significantly to the economy through both local consumption and commercial trade.

Among the crops cultivated in Benue State, maize holds a prominent position. Different maize cultivars are grown across various agricultural zones, catering to different agroecological conditions and market demands. Super 98, Obasuper 1, and local varieties are among the maize cultivars cultivated during the late cropping season. Maize production is vital for food security as it serves as a staple food for a significant portion of the population while also being a source of income for many farmers who sell surplus produce in local markets.

In addition to staple crops, Benue State also cultivates citrus fruits, particularly sweet orange, primarily in the southern part of the Savanna region of Africa (Atanu, Echezona, & Ugwuoke, 2020) [9]. Citrus farming provides an additional source of income for farmers and contributes to the state's agricultural diversity.

Urban agriculture is gaining momentum in the Makurdi metropolis of Benue State, where residents engage in the cultivation of various crops and livestock rearing activities. Leafy vegetables, cassava, sweet potato, tomato, poultry, and goat keeping are among the prominent activities in urban agriculture (Mbah, Attah, & Jiriko, 2019) [6]. Urban agriculture not only supplements household food security but also creates employment opportunities and enhances the resilience of urban communities against food insecurity.

The cultivation of these crops in Benue State reflects the agricultural richness and diversity of the region. The state's favorable climatic conditions, fertile soils, and abundant water resources contribute to the successful cultivation of a wide range of crops throughout the year. Moreover, the agricultural sector plays a crucial role in the state's economy, employing a significant portion of the population and contributing to both rural and urban development.

In conclusion, the cultivation of a diverse range of crops in Benue State, Nigeria, including staples such as maize, rice, yam, and cassava, as well as cash crops like citrus fruits, reflects the agricultural richness and importance of the state in contributing to food production and economic activities. By harnessing its agricultural potential and implementing appropriate policies and interventions, Benue State can further enhance its agricultural productivity, ensure food security, and promote rural development.

Anugwom, & Anugwom, (2022) [1] used evidence from three rural agricultural communities in Nigeria to examine the role and relevance of local institutions and knowledge with regard to climate change adaptation. It argues that the formal climate change response framework has failed to incorporate local institutions as critical components of adaptation strategies, even though local institutions and people have age-old niches and decades of experience in confronting adverse weather events. The findings indicate that these communities have over the years developed critical norms around ensuring agricultural production and stemming the impacts of adverse climatic conditions without government support. The study underpins the resilience of these institutions in climate change adaptation and finds that, despite long bouts with gully erosion and flooding, these communities have over time developed practices and roles that ensure survival. Thus, these communities possess bastions of creativity and experience that may be useful in formal adaptation and resilience strategies to climate change in Nigeria.

Nwafor, Umar, Muhammad, & Oloruntoba, (2014) [7] examined Building resilience for adaptation to climate change among downstream communities in Nigeria through climate smart agriculture. The purpose of this research is to fill up the gap and adopt climate-smart agricultural practices that are suitable for the study area to reduce the impact of climate change especially flooding. Data on rainfall, river discharge and flood occurrences were obtained from Nigerian Meteorological Agency, Lagos, Federal Ministry of Water Resources and Dartmouth Flood Observatory Archive respectively. The rainfall and river flow pattern were determined by calculating the monthly average for 31 years (1982-2012), while the relationship between them was calculated using correlation coefficient and regression. The results show that r=0.79; r = 0.63. The significance of the regression equation was also tested using student‘t’ test and Ho is rejected. Therefore, there is a significant relationship between rainfall pattern and rivers Niger and Kaduna discharge pattern in Niger State. Moreover, about 75% of the annual rainfall total accumulates in the four heaviest rainy months of June, July, August and September and the peak occurs in August. However, the mean monthly discharge of River Niger at Kainji reservoir reaches its peak in September, whereas the highest mean monthly discharge of river Kaduna at Shiroro reach its peak in August. Consequently, the results also show that floods usually occur in the study area between the months of August and September. Therefore, climate smart agricultural practices suitable for the down-stream communities in Niger State should include the use of irrigation system, cultivation of upland rice and use of improved crop varieties (i.e. early maturing and drought resistant crops) to reduce the impact of floods on crop production. Discouragement of transhumance agriculture and establishment of aquaculture can also drastically reduce the impact of flood on agriculture.

Methodology

This study employs a cross-sectional design, collecting data on multiple cases at a single point in time to analyze associations between variables. Targeting farmers in flood-

prone areas of Makurdi Local Government Area, the population is estimated at 5,500 individuals from a total of 365,000 residents.

To determine the appropriate sample size for the study, the Taro Yamane formula is employed, expressed as:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = is the sample size,

N = is the population size, and

e = represents the margin of error, set at 0.05 in this study.

$$n = \frac{5500}{1 + 5500\,(0.05)^2} \qquad \frac{5500}{5500 \times 0.0025}$$

Sample size = (400)

Data for the study were collected through a structured questionnaire schedule.

The frequency distribution table and straightforward percentages were used to qualitatively examine the data produced using the procedures covered above.

Data Analysis and Results

Economic Impact of Flooding on Agricultural Communities

This objective aims to quantify the economic repercussions of flooding on agricultural communities in Benue State, Nigeria. Specific metrics such as income loss, damage to crops and livestock, and disruption of agricultural activities will be evaluated. By conducting surveys, interviews, and data analysis, this objective seeks to provide a comprehensive understanding of the financial strain experienced by agricultural households due to flooding.

Table 1: Community experienced of flooding in the past five years

Variables	Frequency	Percentages (%)
Yes	205	51
No	156	39
N/A	39	10
Total	400	100

***Sources*:** field survey, 2024

The respondents were asked, "Have you or your community experienced flooding in the past five years?" The data obtained revealed that 205 (51%) of the respondents agreed that their community experienced flooding in the past five years, while 156 (39%) disagreed with the statement. Additionally, 39 (10%) of the respondents indicated being undecided, as shown in the table above.

Table 2: Frequency of flooding occur in your area

Variables	Frequency	Percentages (%)
Frequently (annually)	50	12
Occasionally (every few years)	189	47
Rarely (once in several years)	143	36
Other	18	5
Total	**400**	**100**

***Sources*:** field survey, 2024

The respondents were asked, "If yes, how frequently does flooding occur in your area?" The data obtained revealed that 50 (12%) of the respondents experience flooding frequently (annually), 189 (47%) experience it occasionally (every few years), while 143 (36%) experience it rarely (once in several years). Additionally, 18 (5%) of the respondents indicated they were undecided, as shown in the table above.

Table 3: Flooding affected agricultural activities in your community

Variables	Frequency	Percentages (%)
Very severely	195	49
Moderately severely	155	39
Not severely at all	39	9
N/A	11	3
Total	**400**	**100**

***Sources*:** field survey, 2024

The respondents were asked, "How severely have flooding affected agricultural activities in your community?" The data obtained revealed that 195 (49%) of the respondents answered "Very severely," 155 (39%) of the respondents answered "Moderately severely." Additionally, 39 (9%) of the respondents indicated "Not severely at all," while 11 (3%) of the respondents remained undecided, as presented in the table above.

Table 4: Agricultural activities that are most affected by flooding

Variables	Frequency	Percentages (%)
Crop cultivation	245	61
Livestock rearing	65	16
Fishing	70	17
Irrigation systems	15	4
Other	5	1
Total	400	100

***Sources*:** field survey, 2024

The respondents were asked, "Which of the following agricultural activities are most affected by flooding?" The data obtained revealed that 245 (61%) of the respondents reported crop cultivation, 65 (16%) reported livestock rearing, and 70 (17%) reported fishing. Additionally, 15 (4%) respondents indicated that irrigation systems were affected, while 5 (1%) indicated "other," as presented in the table above.

Impacts of Flooding on Livelihood Stability and Food Security

This objective focuses on examining how flooding affects the stability of livelihoods and food security in agricultural communities of Benue State. It involves assessing changes in employment patterns, displacement of populations, access to food sources, and nutritional status before, during, and after flooding events. Through household surveys, qualitative interviews, and analysis of secondary data, this objective aims to identify vulnerabilities and resilience strategies employed by communities to mitigate the adverse effects of flooding on livelihoods and food security.

Table 5: Flooding affected your household income

Variables	Frequency	Percentages (%)
Decreased significantly	219	55
Decreased slightly	105	26
No change	55	14
N/A	21	5
Total	400	100

***Sources*:** field survey, 2024

The respondents were asked, "How has flooding affected your household income?" The data obtained revealed that 219 (55%) of the respondents reported a significant decrease, 105 (26%) reported a slight decrease, while 55 (14%) reported no change. Additionally, 21 (5%) of the respondents indicated they were undecided, as presented in the table above.

Table 6: Alternative sources of income apart from agriculture to sustain your livelihood during flooding seasons

Variables	Frequency	Percentages (%)
Yes	165	41
No	212	53
N/A	23	6
Total	**400**	**100**

***Sources*:** field survey, 2024

The respondents were asked, "Do you have any alternative sources of income apart from agriculture to sustain your livelihood during flooding seasons?" The data obtained revealed that 165 (41%) of the respondents agreed that they have alternative sources of income apart from agriculture to sustain their livelihood during flooding seasons, while 212 (53%) of the respondents disagreed. Additionally, 23 (6%) of the respondents indicated being undecided, as presented in the table above.

Food Security

Food security refers to the condition in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. It encompasses not only the availability of food but also the accessibility, affordability, and quality of food. Achieving food security requires sustainable food production, distribution, and access, as well as addressing issues such as poverty, inequality, and environmental sustainability. It is a critical global issue that impacts the well-being and livelihoods of individuals, communities, and nations worldwide.

Table 7: Flooding impacted food production in your community

Variables	Frequency	Percentages (%)
Decreased significantly	255	64
Decreased slightly	85	21
No change	45	11
N/A	15	4
Total	400	100

***Sources*:** field survey, 2024

The respondents were asked, "How has flooding impacted food production in your community?" The data obtained revealed that 255 (64%) of the respondents reported a significant decrease, 85 (21%) reported a slight decrease, while 45 (11%) reported no change. Additionally, 15 (4%) of the respondents indicated they were undecided, as shown in the table above.

Table 8: Experienced of food shortages or difficulties in accessing food due to flooding

Variables	Frequency	Percentages (%)
Yes	224	56
No	129	32
N/A	47	12
Total	**400**	**100**

***Sources*:** field survey, 2024

The respondents were asked, "Have you experienced food shortages or difficulties in accessing food due to flooding?" The data obtained revealed that 224 (56%) of the respondents agreed that they experienced food shortages or difficulties in accessing food due to flooding, while 129 (32%) disagreed, and 47 (12%) indicated undecided, as presented in the table above.

Table 9: Coping with food shortages during flooding periods

Variables	Frequency	Percentages (%)
Rely on stored food reserves	63	18
Purchase food from markets	75	19
Rely on food aid/relief programs	69	17
Depend on assistance from family/friends	168	42
Other	25	6
Total	**400**	**100**

***Sources*:** field survey, 2024

The respondents were asked, "If yes, how do you cope with food shortages during flooding periods?" The data obtained revealed that 63 (18%) of the respondents rely on stored food reserves, 75 (19%) of the respondents purchase food from markets, while 69 (17%) of the respondents rely on food aid/relief programs. Additionally, 168 (42%) of the respondents depend on assistance from family/friends, and 25 (6%) indicated being undecided, as presented in the table above.

Table 10: Government's response to flooding in your area

Variables	Frequency	Percentages (%)
Very effective	79	20
Moderately effective	186	46
Ineffective	98	25
No response	37	9
Total	**400**	**100**

***Sources*:** field survey, 2024

The respondents were asked, "Overall, how would you rate the government's response to flooding in your area?" The data obtained revealed that 79 (20%) of the respondents found it "Very effective," 186 (46%) of the respondents found it "Moderately effective." Meanwhile, 98 (25%) of the respondents found it "Ineffective," and 37 (9%) of the respondents indicated being "undecided," as presented in the table above.

Discussion of findings

The findings of the study arose from the data presentation and its analysis as contained in tables;

1. **Economic Impact of Flooding on Agricultural Communities:** The study revealed significant economic repercussions of flooding on agricultural communities in Benue State. The findings indicate substantial income loss among farmers due to crop damage, livestock losses, and disrupted agricultural activities. Flooding leads to decreased productivity, increased input costs, and loss of market opportunities, exacerbating the financial strain on already vulnerable households. The study underscores the need for financial assistance, crop insurance schemes, and infrastructure improvements to enhance resilience and mitigate economic losses in flood-prone agricultural areas.
2. **Impacts of Flooding on Livelihood Stability:** Flooding

disrupts the stability of livelihoods in agricultural communities, as evidenced by changes in employment patterns and displacement of populations. The study found that flooding often leads to temporary or permanent displacement of households, causing disruptions in income-earning activities and social networks. Furthermore, the loss of assets and infrastructure exacerbates vulnerabilities, making it challenging for communities to recover and rebuild livelihoods post-flooding. This highlights the importance of implementing early warning systems, evacuation plans, and livelihood diversification strategies to enhance resilience and reduce the socio-economic impacts of flooding on vulnerable populations.

3. **Impacts of Flooding on Food Security:** Flooding significantly affects food security in agricultural communities of Benue State. The study revealed disruptions in food production, distribution, and access, leading to increased food insecurity among households. Flood-induced crop failures and loss of livestock reduce food availability, while damaged infrastructure hinders transportation and market access, resulting in higher food prices and reduced dietary diversity. Vulnerable groups, such as women, children, and the elderly, are disproportionately affected, facing heightened risks of malnutrition and food-related illnesses. To address these challenges, interventions should focus on improving water management, promoting climate-resilient agriculture, and strengthening social safety nets to safeguard food security in flood-prone areas.

Overall, the findings underscore the complex interplay between flooding, economic stability, livelihoods, and food security in agricultural communities of Benue State. Effective mitigation and adaptation strategies must be multi-dimensional, addressing both immediate needs and long-term resilience-building efforts to enhance the socio-economic well-being of vulnerable populations in the face of recurrent flooding events.

Conclusion

Approximately half of respondents (51%) have encountered flooding in their communities within the last five years, signaling a prevalent and consequential issue. The frequency of these occurrences varies, with a significant portion experiencing them periodically (47%), resulting in intermittent disruptions to livelihoods and infrastructure. Nearly half (49%) reported severe impacts on agricultural activities, particularly crop cultivation (61%), fishing (17%), and livestock rearing (16%), showcasing diverse effects across agricultural sectors. A majority (55%) noted a significant decrease in household income due to flooding, exacerbating poverty and financial instability. Additionally, many respondents (41%) rely on alternative income sources beyond agriculture, emphasizing the need for income diversification for resilience. The substantial decline in food production (64%) and reported shortages (56%) highlight the threat of flooding to food security, exacerbating vulnerabilities. Coping strategies during food shortages vary, with reliance on assistance from family/friends (42%) being prevalent, underlining the importance of social networks and community support. Perceptions of government response to flooding are mixed, with a significant portion (25%) considering it ineffective, indicating a necessity for improvements in disaster preparedness and response strategies.

Recommendations

Based on the findings of the study, the following recommendations are made

1. **Holistic Approaches:** Addressing the multifaceted impacts of flooding requires holistic approaches encompassing disaster mitigation, livelihood diversification, and social support mechanisms.
2. **Disaster Preparedness:** Enhance disaster preparedness measures at the governmental level, including early warning systems, infrastructure resilience, and community training programs.
3. **Livelihood Diversification:** Encourage and support livelihood diversification initiatives to reduce dependency on agriculture and enhance resilience to income disruptions during flooding seasons.
4. **Food Security Measures**: Implement measures to strengthen food security, such as promoting sustainable agricultural practices, building food reserves, and improving access to markets.
5. **Community Resilience:** Foster community resilience through the establishment of support networks, community-based disaster risk management initiatives, and capacity-building programs.
6. **Government Response Improvement:** Improve governmental response capabilities through better coordination, allocation of resources, and integration of community feedback in disaster management plans.

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