



PERCEIVED EFFECTS OF FLOODS ON AGRICULTURAL PRODUCTION AND FOOD SECURITY IN SOUTH-SOUTH, NIGERIA

AGNES EDET ASUQUO OFFIONG, BASSEY, NJORKUN NDUBUISI, OBETEN, OKOI OKORN, EVELYN IJEOMA ORJI, EDET, ITAM BEN, AKPO, DAVID MBU

Email: agnesoffiong@yahoo.com, bassey.ndubuisi@unn.edu.ng, okoi123obeten@unical.edu.ng, itamedet@unical.edu.ng, itamedet@unical.edu.ng

ORCID No: <https://orcid.org/0000000347436808>, <https://orcid.org/0000-0003-3301-8250>, <https://orcid.org/0009-0006-0683-3056>, eveonu4real@yahoo.com, <https://orcid.org/0000-0002-7965-5952>, <https://orcid.org/0009-0006-7623-3603>, <https://orcid.org/0000-0002-5944-1875>

(Received, 8 May 2025; Revision Accepted 30, May 2025)

ABSTRACT

The study determined the Perceived Effects of floods on agricultural production and food security in South-South, Nigeria. Specifically, the study assessed the perceived effects of floods on agricultural production and food security; and the strategies for mitigating the impacts of floods on agricultural production and food security in South-South Nigeria. A descriptive survey research design was adopted and it was carried out in South-South region of Nigeria. A total population of 720 consisting 600 farmers and 120 agricultural extension agents were randomly selected from the region and sampled using accidental sampling technique. Structured questionnaire developed by the researcher was used for data collection. The questionnaire was face validated by two experts from the Department of Agricultural Economics, Faculty of Agriculture, University of Calabar, Calabar. Cronbach alpha reliability method was used to ascertain the internal consistency of the instrument and a reliability coefficient of 0.81 was obtained. Data collection was carried out by the researcher and six research assistants. Descriptive statistics was used for data analysis. The findings revealed sixteen (16) effects of floods on agricultural production and food security in South-South, Nigeria among which are destruction of crops and farmland, loss of livestock, contamination of soil and water sources, reduction in crop yields and quality, and displacement of farming communities. The findings also identified eighteen (18) strategies for mitigating the effects of floods on agricultural production and food security in South-South Nigeria. The strategies include implement early warning systems for floods, improve drainage systems and flood control measures, promote sustainable land use practices to reduce soil erosion, provide insurance schemes for farmers against flood damage, develop flood-tolerant crop varieties among others. Based on the findings, it was concluded that the effects of flood on agricultural production and food security are grievous, and the effects can only be mitigated by adopting the strategies identified in this study. The study therefore, recommended among others that Farmers in South-South Nigeria should be encouraged to diversify their crops in order to reduce the risk of flood attack in their farms.

KEYWORDS: Perceived effects, Floods, Agricultural Production, Food Security, South-South.

INTRODUCTION

The adverse effects of flooding on agricultural productivity and food security in South-South Nigeria are of critical concern to researchers, policymakers, and stakeholders.

As one of Africa's most populous nations, Nigeria is already facing significant food security challenges, and the rising frequency and intensity of flood are compounding the problem (Durodola, 2019).

Agnes Edet Asuquo Offiong, Environmental Education Department, University of Calabar, Calabar
Bassey, Njorkun Ndubuisi, Department of Agricultural Education, University of Nigeria, Nsukka.
Obeten, Okoi Okorn, Educational Management, Department, University of Calabar, Calabar
Evelyn Ijeoma Orji, Institute of Education, University of Calabar, Calabar
Edet, Itam Ben, Department of Health Education & Promotion, University of Calabar, Calabar.
Akpo, David Mbu, Department of Environmental Education, University of Calabar, Calabar

Reports from the Nigerian Meteorological Agency (NIMET, 2020) indicate an increasing prevalence of flood events in recent years, leading to extensive destruction of farmlands, crops, and rural infrastructure. Olufeagba and Ekanem (2020) describe flood as the submergence of land caused by the overflow of rivers, lakes, or dams, or the accumulation of water following extreme rainfall or storm surges. Similarly, flooding, as defined by Nzeadibe et al. (2019), occurs when excessive water overflows onto typically dry land, often due to intense rainfall or snowmelt that surpasses the capacity of natural or artificial drainage systems, such as rivers and reservoirs. Anyadike et al. (2021) further define flooding as a natural disaster that occurs when heavy rainfall, storm surges, or dam and levee failures lead to water spilling over into normally dry areas.

Flooding, frequently linked to climate change, has devastating consequences for agriculture, resulting in crop destruction, livestock fatalities, and soil degradation (Adeleke & Ogunjimi, 2020). According to Olayemi and Fayomi (2019), floods not only lead to the loss of human lives and destruction of property but also disrupt economic activities and deplete agricultural resources. The South-South region of Nigeria, which is predominantly agrarian, is particularly susceptible to flooding, with rural communities bearing the brunt of its adverse impacts. Recent occurrences of severe and recurrent floods in this region have significantly affected agricultural productivity and food security (Adeleke & Ogunjimi, 2020). Given that agriculture is a key driver of the national economy, the region's vulnerability to floods contributes to reduced agricultural output, further worsening food insecurity (Ajewole & Ogunjimi, 2019).

Agricultural production encompasses the management of resources and processes involved in cultivating crops and rearing livestock for consumption and commercial purposes (Johnson, 2021). Harasym (2019) emphasizes that sustainable agricultural production requires environmentally responsible practices that ensure long-term ecological balance while satisfying consumer food demands. Adesina (2019) describes agricultural production as the comprehensive process of growing crops and raising livestock, which includes activities such as land preparation, planting, cultivation, harvesting,

and marketing. This sector covers various subfields, including cassava cultivation and processing, poultry and fish farming, vegetable and rice production, plantain and banana farming, snail farming, and honey production, among others. The significance of agricultural production extends beyond food availability; it is fundamental to economic development, employment creation, and poverty reduction, particularly in rural Nigeria (Abubakar, 2019). Strengthening agricultural productivity directly enhances food security, as increased food production ensures better access to nutrition, economic stability, and overall national well-being.

Food security is a major global issue, with a significant proportion of the population not having reliable access to nutritious and affordable food. In Nigeria, food insecurity persists, particularly among vulnerable groups (Oyebade et al., 2020). The country's agricultural sector, which employs approximately 30% of the workforce, has significant potential for addressing food security concerns (Federal Ministry of Agriculture and Rural Development, 2020). Agricultural production has been identified as a crucial sector for enhancing food security (Food and Agriculture Organization (FAO), 2018). Food security is a situation that 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 (FAO, 2021). On the other hand, food insecurity according to Sharma, et al (2021), refers to barriers that prevent individuals from obtaining enough nutritious food to meet their dietary needs. This can result in hunger, malnutrition, and other health related issues due to lack of essential nutrients. One of the notable causes of food insecurity in Nigeria is floods.

Flood can cause poor agricultural production which result to food insecurity in the country. Flood can lead to crop damage and yield losses, reducing agricultural production and food security (Ologundudu et al., 2019). Also, flooding can contaminate water sources used for irrigation and drinking, thereby posing health risks to humans, crops and livestock and threatening food security (Oruonye et al., 2020). Excessive rainfall can result in runoff carrying pollutants and pathogens into water bodies, which can negatively affect crop health and quality.

Furthermore, the destruction of infrastructure such as roads, bridges, and storage facilities during floods can disrupt supply chains and access to markets, affecting agricultural productivity and food availability (Adeoye et al., 2019). Farmers may struggle to transport their produce to markets or store harvested crops properly, leading to post-harvest losses and reduced food security. In addition, flooding can displace farming communities and destroy homes, livestock, and livelihoods, leading to food insecurity and economic hardship (Ogundeji et al., 2019). Farmers may lose their source of income and means of food production, exacerbating food shortages and hunger in affected regions.

Furthermore, the effects of flood on agricultural production and food security in South-South Nigeria are compounded by the lack of adequate infrastructure and support systems for farmers to cope with and recover from flood events (Adewole, 2019). The absence of early warning systems and emergency response mechanisms has hindered farmers' ability to prepare for and mitigate the effects of flooding on their crops and livestock (Ogbonna et al., 2020). Additionally, the limited access to credit and insurance services for farmers in the region has made it difficult for them to recover from the financial losses incurred during flood events (Ibe, 2019).

Despite the severity of the problems associated with flood, there is a lack of research on the effects of flood on agricultural production and food security in South-South Nigeria. Most of the existing research has focused on the economic impacts of flood, with little attention paid to the impacts of flood on agricultural production and food security (Adeleke & Ogunjimi, 2020). Therefore, this study aimed at investigating the perceived effects of flood on agricultural production and food security in South-South Nigeria, with a focus on providing strategies for mitigating the impacts.

Research Questions

The following research questions guided the study:

1. What are the effects of floods on agricultural production and food security in South-South Nigeria?
2. What are the strategies for mitigating the effects of floods on agricultural production and food security in South-South Nigeria?

Theoretical Framework

The study is anchored on the following theories:

Hazard Theory

Sustainable Development Theory

Hazard Theory: Hazard Theory was propounded by Gilbert White (1945) and later developed by other researchers, including Burton, Kates, and White (1978). Hazard Theory focuses on understanding the natural and human-induced factors that contribute to the occurrence and impact of hazards, such as floods, landslides, and droughts. The theory aims to identify the underlying causes of hazards and develop strategies for mitigating their impacts. Hazard theory can be applied to this study by examining the natural factors that contribute to flooding in the region, such as rainfall patterns, soil type, and topography; and also, by analyzing the human-induced factors that exacerbate flood impacts, such as deforestation, poor land use planning, and inadequate flood control measures.

Sustainable Development Theory: Sustainable development theory was popularized by the Brundtland Commission (1987), which was established by the United Nations to address environmental and developmental issues. The theory posits that development should meet the needs of the present without compromising the ability of future generations to meet their own needs. The theory emphasizes the importance of balancing economic, social, and environmental considerations to achieve sustainable development. Sustainable development theory can be applied to this research work by examining the economic, social, and environmental impacts of floods on agricultural production and food security in the region; furthermore, by identifying sustainable development strategies that can help reduce the vulnerability of agricultural production and food security to flood impacts, such as climate-resilient agriculture, flood-control measures, and livelihood diversification.

Review of Related Literature

Oyedeji and Alabi (2022) carried a study on the assessment of flood impacts on agricultural production in Osun State, South West Nigeria. A survey research design was adopted. A population of 420 farmers was selected through multi-stage sampling technique and sampled using structured questionnaire. Descriptive statistics and inferential statistics (ANOVA) were used for data analysis.

The findings revealed that flooding significantly reduced agricultural production in Osun State; also, the finding indicated that the majority of farmers (75%) experienced crop losses due to flooding among others. Based on the findings, it was concluded that flooding has devastating impacts on agricultural production and food security in Osun State. The study therefore addresses how flooding affects agricultural production and food security in Nigeria. Oyedele and Alabi (2022) quantitatively assessed flood impacts in Osun State, South West Nigeria. The study in likewise explores perceived effects in the South-South region having same core issues within Nigeria, though differ in geographical focus and methodological approach, with the study being a quantitative analysis and the researchers adopting a qualitative exploration of perceptions in their hand.

Eze and Onyeneke (2022) identified the strategies for mitigating flood impacts on agricultural Production and food security in Ebonyi State, South East Nigeria. A descriptive survey research design was adopted. A total population of 520 farmers selected through multi-stage sampling technique was studied. The instrument for data collection was a questionnaire. The data collected was analyzed using descriptive and inferential statistics. The results revealed that the majority of farmers (75%) experienced food insecurity due to flood impacts. Also, the findings showed that flood-resistant crop varieties and agroforestry practices were identified as effective strategies for mitigating flood impacts among others. From the results, the study concluded that effective strategies for mitigating flood impacts on agricultural production and food security in Ebonyi State include flood-resistant crop varieties, agroforestry practices, and flood early warning systems.

Nwachukwu and Onyekuru (2020) carried a study on mitigating flood impacts on agricultural Production and food security in Imo State, South East Nigeria. Ex-post facto research design was adopted for the study. The population for the study was 300 farmers selected through stratified random sampling technique. Structured questionnaire was used for data collection. Descriptive statistics and inferential statistics (regression analysis) were employed to analyze the data collected.

The findings showed that flooding significantly reduced agricultural production in Imo State; also, the findings indicated that flood-resistant crop varieties and flood early warning systems are effective strategies for mitigating flood impacts among others. Based on the results, it was concluded that effective strategies for mitigating flood impacts on agricultural production and food security in Imo State include flood-resistant crop varieties, flood early warning systems, and access to credit and extension services.

RESEARCH METHODOLOGY

A descriptive survey research design was adopted for the study and it was conducted in the South-South region of Nigeria. South-South region comprises of six states, namely: Akwa-Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers. The target population for this study comprised 720 individuals, consisting of 600 farmers and 120 agricultural extension agents. Given the manageable size of the population, the researchers employed a stratified sampling approach, stratifying by the six states that constitute the South-South region. From this population, a sample of 100 farmers and 20 agricultural extension agents was randomly selected from each state. Respondents were selected using an accidental sampling technique, and data were collected with a structured questionnaire.

The questionnaire was divided into two parts. Part 1 was structured to collect data on personal information about the respondents while Part 2 was divided into 2 different sections (A and B). Section A collected data on the impacts of floods on agricultural production and food security in South-South Nigeria; while Section B collected data on the strategies for mitigating the impacts of floods on agricultural production and food security in South-South Nigeria. The questionnaire items had a four-point response option of Strongly Agree (S.A), Agree (A), Disagree (D) and Strongly Disagree (SD) with corresponding values of 4, 3, 2, and 1 respectively.

The instrument was face validated by three experts from the Department of Agricultural Economics, Faculty of Agriculture, University of Calabar, Calabar, Cross River State.

The validated instrument was trial tested on 42 respondents (30 farmers and 12 agricultural extension workers) in South West region of Nigeria (precisely, Ogun State which has been revealed of having the related flood problem as in South-South region) in order to determine the reliability and suitability of the instrument for the study. Cronbach Alpha coefficient was used and the result revealed 0.81 reliability coefficient value. This showed that the instrument was reliable and could effectively collect the desired data for the study.

Data collection was carried out by the researcher and six research assistants (that is, one research assistant for each State). Both the researcher and research assistants were fully involved in administering and retrieving of the questionnaires from the respondents. After the questionnaire were administered and retrieved, it was noticed that some were not properly rated or

ticked and they were not used for the final analysis whereas few others were not retrieved from the respondents. Only the responses of 695 respondents out of 720 comprising 580 farmers and 115 agricultural extension workers were used for data analysis. This implied that 25 of the questionnaires were not used for data analysis.

Data collected from the study were analyzed using descriptive statistics (Mean and Standard Deviation). Mean was used to answer the two (2) research questions. The decision rule was that any mean response whose value is 2.50 and above was regarded as "agreed by the respondents" while any one whose mean value is below 2.50 was regarded as "disagreed" by the respondents. Standard deviation was used to find out how close or far the responses of the respondents were to the mean. All the analyses were carried out using Statistical Package for Social Sciences (SPSS) software version 25.

Presentation of Results

Research Question 1: What are the effects of floods on agricultural production and food security in South-South Nigeria?

Table 1: Mean Responses and Standard Deviation Analysis on the effects of floods on agricultural production and food security in South-South Nigeria

S/N	Effects of floods on agricultural production and food security in South-South Nigeria include:	\bar{x}	SD	Rmks
1	Destruction of crops and farmland	3.19	0.71	Agreed
2	Loss of livestock	3.10	0.90	Agreed
3	Contamination of soil and water sources	3.01	0.87	Agreed
4	Disruption of planting and harvesting schedules	3.11	0.66	Agreed
5	Reduction in crop yields and quality	3.22	0.99	Agreed
6	Displacement of farming communities	3.33	0.84	Agreed
7	Damage to agricultural infrastructure such as irrigation systems and storage facilities	3.12	0.86	Agreed
8	Loss of income for farmers	3.40	0.78	Agreed
9	Shortage of food supply leading to increased prices	3.17	0.88	Agreed
10	Decline in food production leading to food insecurity	3.11	0.89	Agreed
11	Loss of agricultural biodiversity	2.90	0.81	Agreed
12	Loss of rural livelihoods	2.67	0.83	Agreed
13	Increased vulnerability to food crises and malnutrition	3.20	0.77	Agreed
14	Difficulty in accessing inputs such as seeds and fertilizers	2.88	0.76	Agreed
15	Impact on soil fertility and erosion	3.00	0.77	Agreed
16	Increased dependency on food aid and relief programmes	3.22	0.89	Agreed

Key: \bar{X} = Mean; SD = Standard Deviation, Farmers = 580, Extension Workers = 115; Total = 695

The data presented in Table 1 showed the mean responses and standard deviation of the impacts of floods on agricultural production and food security in South-South Nigeria. The result indicated that all the 16 items obtained mean values ranging from 2.67 to 3.40 which are above the cut-off point of 2.50. This revealed that the

respondents agreed that all the 16 items are the effects of floods on agricultural production and food security in South-South Nigeria. The corresponding standard deviation to each of the items ranged from 0.66 to 0.99 showing that the opinions of the respondents were very close to each other and not from the mean.

Research Question 2: What are the strategies for mitigating the effects of floods on agricultural production and food security in South-South Nigeria?

Table 2: Mean Responses and Standard Deviation Analysis on the strategies for mitigating the effects of floods on agricultural production and food security in South-South Nigeria

S/N	Strategies for mitigating the impacts of floods on agricultural production and food security in South-South Nigeria are:	\bar{x}	SD	Rmks
1	Implement early warning systems for floods	3.10	0.77	Agreed
2	Improve drainage systems and flood control measures	3.20	0.70	Agreed
3	Promote sustainable land use practices to reduce soil erosion	2.79	0.87	Agreed
4	Invest in climate-resilient agriculture techniques	3.11	0.82	Agreed
5	Provide insurance schemes for farmers against flood damage	3.41	0.83	Agreed
6	Develop flood-tolerant crop varieties	3.10	0.90	Agreed
7	Diversify agricultural production to reduce dependence on single crops	3.30	0.87	Agreed
8	Support farmers with post-flood recovery programmes	3.16	0.77	Agreed
9	Improve access to irrigation systems for farmers	2.48	0.78	Disagreed
10	Strengthen agricultural extension services to provide guidance on flood preparedness	3.18	0.90	Agreed
11	Promote conservation agriculture practices to improve soil health	2.99	0.80	Agreed
12	Establish community-based disaster risk reduction programmes	2.80	0.81	Agreed
13	Enhance local food storage and preservation techniques	3.10	0.76	Agreed
14	Support small-scale farmers with access to credit and inputs	3.11	0.77	Agreed
15	Encourage the use of agroforestry systems to improve resilience to floods	2.79	1.00	Agreed
16	Develop alternative income-generating opportunities for farmers	2.44	0.99	Disagreed
17	Provide training and capacity building for farmers on flood preparedness	3.33	0.77	Agreed
18	Establish food security and nutrition programs for vulnerable populations	3.12	0.73	Agreed
19	Advocate for policies and investments that prioritize agricultural resilience to floods.	2.80	0.88	Agreed
20	Improve infrastructure for transportation and market access	2.77	0.87	Agreed

Key: \bar{X} = Mean; SD = Standard Deviation, Farmers = 580, Extension Workers = 115; Total = 695

The result presented in Table 2 showed the mean responses and standard deviation on the strategies for mitigating the effects of floods on agricultural production and food security in South-South Nigeria. The result revealed that 18 items out of the 20 items had mean values above cut off point of 2.50. This implies that the respondents agreed that the 18 items are the strategies for mitigating the impacts of floods on agricultural production and food security in South-South Nigeria. Only two of the items (9 and 16) had mean value below the cut-off point of 2.50, indicating that the respondents disagreed that the two items are the strategies for mitigating the impacts of floods on agricultural production and food security in South-South Nigeria. The corresponding standard deviation to each of the items ranged from 0.73 to 1.00, showing that the opinions of the respondents on the strategies for mitigating the effects of floods on agricultural production and food security in South-South Nigeria were very close to each other and not far from the mean.

DISCUSSION OF THE FINDINGS

The findings on the perceived effects of floods on agricultural production and food security in South-South Nigeria presented in Table 1 revealed sixteen (16) effects, these include: destruction of crops and farmland, loss of livestock, contamination of soil and water sources, disruption of planting and harvesting schedules, reduction in crop yields and quality, displacement of farming communities, damage to agricultural infrastructure such as irrigation systems and storage facilities, loss of income for farmers, shortage of food supply leading to increased prices, decline in food production leading to food insecurity, loss of agricultural biodiversity, loss of rural livelihoods, increased vulnerability to food crises and malnutrition, difficulty in accessing inputs such as seeds and fertilizers, impact on soil fertility and erosion, and increased dependency on food aid and relief programmes. The findings on reduction in crop yields and quality and destruction of crops and farmland align with Ologundudu et al. (2019) who stated that floods can lead to crop damage and yield losses, thereby reducing agricultural production and food security. According to Adebayo and Okorie (2019), flood can cause significant damage to crops, leading to reduced yields and losses for farmers.

This happens when flood filled the farmlands, causing soil erosion, loss of nutrients, and destruction of crops, ultimately compromising food production. The finding on the effect of flood on soil fertility and erosion agrees with Adedeji et al. (2021) who noted that flood-induced soil erosion and sediment deposition that can alter soil fertility and structure, affecting crop growth and productivity in affected areas. Flood can cause soil erosion and degradation, leading to reduced fertility and productivity (Adeleke & Ogunjimi, 2020). The loss of topsoil nutrients and compaction due to flooding can hinder root development and nutrient uptake by crops, ultimately diminishing agricultural production and food security (Adedeji et al., 2021). This can have long-term impacts on agricultural production and food security. The finding on displacement of farming communities by flood is in support of Ogundeji et al., (2019) who pointed out that flooding can displace farming communities and destroy homes, livestock, and livelihoods, leading to economic hardship and food insecurity. Farmers may lose their source of income and means of food production, exacerbating food shortages and hunger in affected regions. The finding on increased vulnerability to food crises and malnutrition aligns with (Nwosu & Nwokeji, 2020) who stated that floods can lead to increased poverty and vulnerability, particularly for rural communities. This can have long-term impacts on human well-being and economic development. The findings on the strategies for mitigating the effects of floods on agricultural production and food security in South-South Nigeria identified eighteen (18) strategies, they are as follows: implement early warning systems for floods, improve drainage systems and flood control measures, promote sustainable land use practices to reduce soil erosion, invest in climate-resilient agriculture techniques, provide insurance schemes for farmers against flood damage, develop flood-tolerant crop varieties, diversify agricultural production to reduce dependence on single crops, support farmers with post-flood recovery programmes, strengthen agricultural extension services to provide guidance on flood preparedness, promote conservation agriculture practices to improve soil health, establish community-based disaster risk reduction programmes, enhance local food storage and

preservation techniques, support small-scale farmers with access to credit and inputs, encourage the use of agroforestry systems to improve resilience to floods, provide training and capacity building for farmers on flood preparedness, establish food security and nutrition programs for vulnerable populations, advocate for policies and investments that prioritize agricultural resilience to floods, and improve infrastructure for transportation and market access. The finding on diversification of agricultural production to reduce dependence on single crops is in support of Ajayi et al. (2020) who noted that diversifying crops grown in flood-prone areas can help ensure a more resilient agricultural system. By planting a variety of crops, farmers can minimize the risk of losing entire harvests to floods. The finding on implementation of early warning systems for floods aligns with Adebayo and Okorie (2019) who stated that implementing flood early warning systems can help farmers and rural communities prepare for impending floods, reducing the risk of damage to crops and livestock. Timely information about potential flooding can allow farmers to take necessary precautions to protect their crops (Olaekan et al. (2021). This can be achieved through the use of satellite imaging, weather forecasting, and mobile phone alerts (Adebayo & Okorie, 2019). The result obtained on provision of insurance schemes for farmers against flood damage is greatly in support of Olasanmi et al. (2020) who maintained that providing farmers with access to agricultural insurance can help mitigate the financial losses incurred due to flood-related damages. Insurance coverage can provide a safety net for farmers, enabling them to recover and sustain their agricultural activities after a flood event (Olasanmi et al., 2020). Also, the finding on develop flood-tolerant crop varieties is in line with Ajewole and Ogunjimi, (2019) who buttressed that developing and promoting flood-resistant crop can help reduce the impacts of floods on agricultural production. This can include the use of genetic modification, breeding programmes, and seed selection. Furthermore, the result on establish community-based disaster risk reduction programmes is an accordance with Nwosu and Nwokeji (2020) who stressed that implementing community-based flood management programmes can help build the resilience of rural

communities to floods, through the use of local knowledge, skills, and resources. Collaborative efforts involving local stakeholders can lead to effective response and recovery strategies in the event of flooding (Game et al., 2021).

Conclusion

The impacts of floods on agricultural production and food security in South-South Nigeria are severe and far-reaching. Floods have devastating effects on agricultural production, leading to reduced crop yields, decreased food availability, and increased food prices. The social and environmental impacts of floods are also significant, leading to displacement of rural communities, loss of livelihoods, and environmental degradation. Therefore, it is essential to adopt strategies to mitigate the impacts of floods on agricultural production and food security in South-South Nigeria. In conclusion, the impacts of floods on agricultural production and food security are grievous, and the impacts can only be overcome by adopting the strategies identified in this study.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made:

1. Flood-resistant crop varieties should be developed and made available to farmers in in South-South Nigeria.
2. Farmers in South-South Nigeria should be encouraged to diversified their crops in order to reduce the risk of flood attack in their farms.
3. Farmers should be trained by extension agents on the need to adopt sustainable land use practices to reduce the impact of soil erosion and flood attacks in their farms.
4. Farmers should also be advised to insure their farms with reputable insurance companies in Nigeria to enable them bounce back when there is flood attack in their farms.

REFERENCES

- Abubakar, M., 2019. The contribution of agricultural production to sustainable development in Nigeria. *Journal of Sustainable Development*, 4(2), 89-102. <https://doi.org/10.5539/jsd.v4n2p89>

- Adebayo, A. A., and Okorie, I. C., 2019. Impact of flood on agricultural production in Nigeria. *Journal of Agricultural Extension*, 33(1), 1-11. <https://doi:10.4314/jae.v33i1.1>
- Adedeji, O. H., Ogundare, T. B., and Sorunke, J. A., 2021. Impacts of flooding on soil fertility: A review. *Journal of Soil Science and Environmental Management*, 12(1), 1-13. <https://doi:10.5897/JSEM2020.0897>
- Adeleke, O., and Ogunjimi, S. I., 2020. Climate change and agricultural productivity in Nigeria: A review. *Journal of Agricultural Extension*, 34(1), 1-13. <https://doi:10.4314/jae.v34i1.1>
- Adeoye, A. S., Awomeso, J. A., Adeofun, C. O., and Adeniyi, O. N., 2019. Impacts of flooding on agricultural production: Evidence from farmers in Omu-Aran, Kwara State, Nigeria. *International Journal of Agricultural Economics*, 4(3), 1-10. <https://doi:10.12983/ijaees-2019-p001-010>
- Adesina, A., 2019. Enhancing agricultural production in Nigeria: The role of modern technology. *Journal of Agricultural Science*, 3(1), 45-58. <https://doi.org/10.1016/j.jagrisci.2019.06.003>
- Adewole, O. O., 2019. Impact of flooding on food security: Implication for sustainable agriculture in Nigeria. *Journal of Agricultural Science*, 11(8), 344-350. <https://DOI:10.5539/jas.v11n8p344>
- Ajayi, O. Y., Akinyemi, F. O., and Oladimeji, B. S., 2020. Coping strategies to mitigate the impacts of floods on crop production in Nigeria. *Journal of Agricultural Extension and Rural Development*, 12(2), 85-98. <https://doi.org/10.5897/JAERD2020.1211>
- Ajewole, O. C., and Ogunjimi, S. I., 2019. Climate change and agricultural development in Nigeria: A review. *Journal of Sustainable Development*, 12(3), 1-12. <https://doi:10.5539/jsd.v12n3p1>
- Anyadike, R. N. C., Onwuemesi, A.G., and Ucherek, U. G., 2021. Assessing the costs of floods and farmer's adaptation strategies in selected farming communities in Anambra State, Nigeria. *Frontiers in Sustainable Food Systems*, 5, 655078. <https://doi.org/10.3389/fsufs.2021.655078>
- Brundtland, G. H., 1987. *Our common future: The world commission on environment and development*. Oxford University Press.
- Burton, I., Kates, R. W., and White, G. F., 1978. *The environment as hazard*. Oxford University Press.
- Durodola, O. S., 2019. The impact of climate change induced extreme events on agriculture and food security: A review on Nigeria. *Agricultural Sciences*, 10(4), 487-498. <https://doi:10.4236/as.2019.104038>
- Eze, C. C., and Onyeneke, R. U., 2022. Strategies for mitigating flood impacts on agricultural production and food security in Ebonyi State, South East Nigeria. *Journal of Agricultural and Food Sciences*, 10(3), 1-12.
- Game, T. A., Olalekan, A. P., and Olanmi, O. W., 2021. Community-based disaster risk reduction for flood resilience in Nigeria. *Disaster Prevention and Management*, 30(2), 192-204. <https://doi.org/10.1108/DPM-09-2019-0292>
- Harasym, K., 2019. *Sustainable agriculture: Concepts, analysis, and case studies*. Springer.

- Ibe, C., 2019. Flood and agriculture: A study of irreparable damages on farming communities. *International Journal of Multidisciplinary Research and Modern Education*, 5(1), 54-60. <https://DOI:10.47612/ijmrme.v5i1.127>
- Johnson, S., 2021. Value-added agriculture: Strategies for success in a competitive market. Routledge.
- Nwachukwu, I. G., and Onyekuru, N. A., 2020. Mitigating flood impacts on agricultural production and food security in Imo State, South East Nigeria. *Journal of Environmental Issues and Agriculture in Developing Countries*, 12(2), 1-15.
- Nwosu, E. C., and Nwokeji, E. I., 2020. Climate change and food security in Nigeria: A review. *Journal of Food Science and Technology*, 57(2), 1-12. <https://doi:10.1007/s13394-019-0003-4>
- Nzeadibe, T.C., Ndulue, O.A., and Okoye, S.O., 2019. Flood risk perception, adaptation strategies and policy implications in urban Nigeria: The case of Port Harcourt City. *Urban Science*, 3(4), 107. <https://doi.org/10.3390/urbansci3040107>
- Ogbonna, E. O., et al., 2020. An assessment of farmers' coping strategies to flood in Southern Nigeria. *Journal of Economics and Sustainable Development*, 12(4), 110-118. <https://DOI:10.7176/JESD.10.7176/jesd.v12n4p110>
- Ogundeji, A. A., Ahmed, R. O., and Ali, I. O., 2019. Socio-economic impacts of flooding on agricultural households in Nigeria: A case study of Kogi State. *International Journal of Rural Studies*, 26(2), 65-79. <https://doi:10.21847/1728-3569/2019/v26i2a6>
- Olalekan, A. P., Game, T. A., and Olasanmi, O. W., 2021. Early warning systems for flood risk management in Nigeria: a review of current practices and challenges. *Journal of Disaster Risk Science*, 2(2)1-13. <https://doi.org/10.1007/s13753-021-00319-6>
- Olasanmi, O. W., Adewumi, I. K., and Game, T. A., 2020. Enhancing food security through agricultural insurance in flood-prone areas of Nigeria. *Journal of Agriculture and Food Security*, 8(2), 65-78. <https://doi.org/10.15641/jafs.v8i2.87>
- Olayemi, J. K., and Fayomi, O. S. I., 2019. Influence of flood disaster on livelihood sustainability in Ondo State, Nigeria. *Journal of Disaster Risk Studies*, 11(1), 401-412. <https://doi.org/10.4102/jamba.v11i1.401>
- Ologundudu, A. E., Ahmed, S. B., and Lawal, S. O., 2019. Economic impacts of flooding on agricultural production in Nigeria: A case study of Niger State. *Nigerian Journal of Agriculture, Food and Environment*, 15(2), 112-120. <https://doi:10.309`6/2315-3293.152192>
- Olufeagba, B. J., and Ekanem, E. E., 2020. Assessment of the impact of urban flooding on food security in Lagos, Nigeria. *Environmental Research, Engineering and Management*, 76(1), 128-137. <https://doi.org/10.5755/j01.arem.76.1.23381>
- Oruonye, E. D., Ogunmola, C. O., and Ibeogu, M. N., 2020. Water contamination following flooding: Implications for agricultural production and food security in Nigeria. *International Journal of Water Resources and Environmental Engineering*, 12(1), 1-10. <https://doi:10.5897/IJWREE2020.0862>

- Oyebade, S. A., Oguntoyinbo, F. A., and Oyedele, O. J., 2020. Food insecurity among Nigerian households. *Journal of Agricultural and Food Economics*, 8(1), 1-12.
- Oyedeji, A. A., and Alabi, O. O., 2022. Assessment of flood impacts on agricultural production in Osun State, South West Nigeria. *Journal of Agricultural and Food Sciences*, 10(2), 1-15.
- Sharma, S., DePue, J., and Coberley, C., 2021. Understanding food insecurity and the role of the built environment in addressing social determinants of health. *Frontiers in Sustainable Food Systems*, 5. <https://doi.org/10.3389/fsufs.2021.673167>
- United Nations., 1992. Agenda 21: Programme of action for sustainable development. United Nations Conference on Environment and Development
- White, G. F., 1945. Human adjustment to floods. University of Chicago Press.