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Developing Financial Resilience for Food Security and Socio-Demographic Adaptation to Climate Change in Flood-Prone Farming Communities of South-East, Nigeria

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Abstract
This study examined the financial and socio-demographic vulnerability and adaptive responses employed in dealing with climate change and food insecurity by households in flood-prone farming communities of South-East, Nigeria from 2012 to 2022. Methodology adopted include questionnaire, focus group discussions and key informant interviews. 400 households were sampled using multi-stage, stratified and random sampling methods and the data were analysed using descriptive and inferential statistics. Results show that financial and socio-demographic vulnerability strongly depends on gender, age, years of experience, level of education, social safety nets, micro-credit access, income diversification, and engagement in farmers' cooperatives. The findings also show that coastal communities have a wide range of early warning signs that alert them of forthcoming changing climate and seasonal flooding, namely singing of birds, infestation of insects, water colour, floats of leaves and consecutive rainfalls. The findings further revealed that coastal farming communities employ financial and adaptive socio-demographic measures to respond to climate variability impacts, such as reducing household expenses, increasing social involvement in farmers' cooperatives, relocation, re-enforcement of building foundation, changeing crop planting and harvesting period. This study recommends government sustainable policies, strategies and programmes that will ensure social security, provide food safety nets, insurance scheme, and micro-credit access to the coastal communities and at the same time enhance income diversification, cooperative associationship, increase knowledge about climate change, improve alternative skills through training and involve farmers' in adaptation planning to enhance financial resilience and socio-demographic adaptation to variability in climate and ensure sustainable food security.

Keywords: Financial resilience, socio-demographic adaptation, climate change, food security, insurance scheme, micro-credit access

INTRODUCTION: Flooding is caused by natural and human activities such as high temperature, excessive rainfall, nature of soils, excessive global Greenhouse Gas (GHG) Emissions, house development in flood plains, deforestation, poor waste disposal practices resulting in the blockage of drains, poor environmental planning and weak enforcement of policies (Ajumobi, Womboh & Ezem, 2023; Ajiboye & Orebiyi, 2022; Echendu, 2021). The primary source of seasonal flooding caused by variability in climate is excessive precipitation (MacLeod, Dankers, Graham, Guigma, Jenkins, Todd, & Mwangi, 2021). Tramblay, Villarini, El-Khalki, Gründemann, and Hughes (2021) however, opined that flood occurrence depends on soil moisture, the saturation of wetlands in riverine areas and global rise in sea level caused by global warming.

In 2012, flooding became a national issue in Nigeria and South-East states were severly affected. The trend continued till 2022 in which the higest flood disaster was recorded with devastating impact on livelihood assets, food stocks and yield prospects from faremers harvest (Obiwulu, Syahreza & Oktari, 2023; FAO, 2022). The flood also negatively impacted fish production as aquatic ecosystems and fish farms were damaged, exposing fish farmers to food insecurity and income loss (FAO, 2022). Small-scale farmers were highly exposed to natural, occupational, health-related and financial risks, making them unprecedently vulnerable to financial and food insecurity, orchestrated by climate change shocks (Silva, Pennino &, Lopes, 2019).

Vulnerability constitutes of the working mechanism of a combination of exposure and sensitivity that represent the susceptibility to harm from a given environmental change (Bennett, Blythe, Tyler & Ban, 2016). Adaptation is an adjustment to actual or expected variability in climate and its effects, in order to reduce harm and exploit beneficial opportunities (IPCC, 2019). Financial resilience and socio-demographic adaptation of farming communities refers to how they are able to withstand life events that impact on their livelihoods after undesirable shocks (Grafton, 2010). How individuals and communities adapt to climate change depends on a diverse range of financial and socio-demographic factors including social norms and values, local environmental conditions, socio-economic status, and inequality (Savo, Morton & Lepofsky, 2017).

The effects of flooding on food security, health and the environment in Nigeria had been extensively discussed and these range from obstruction of traffic, submerging of roads, disruption of economic activities, coastal erosion, loss of property, loss of lives, displacement of people, water pollution and diseases (Obiwulu, Syahreza & Oktari, 2023; Ajiboye & Orebiyi, 2022; Echendu, 2021; Duru & Chibo, 2014). Studies on food security carried out in Nigeria (Adu, Olajide & Popoola, 2023; Ozoh, 2020; Abubakar, Umar, Barde, & Adamu, (2020); Atoloye, Ogunba & Samuel, 2015; Ajaero, 2017; Ogundari (2017) centered on food security patterns and coping strategies; food security status and determinants of food security among households. There is dearth of studies on financial resilience and socio-demographic adaptation to climate variability and food security in literature and in the study area (South-East, Nigeria). Similarly, previous studies have provided recommendations for climate change adaptation for communities in coastal areas (Ajumobi, Womboh & Ezem, 2023; Ajiboye & Orebiyi, 2022; MacLeod *et al.,* 2021; Ajaero, 2017; Efobi & Anierob, 2013), these studies, however did not profer solutions for financial resilience and socio-demographic adaptation. This study explored these gaps in literature and examined the vulnerability to climate variability of farming communities in the riverine areas of South-East, Nigeria, by ascertaining the variations in households' climate change and flood vulnerability exposures and quantified households' food security status in relation to the factors that influence households' financial access, financial inclusion and socio-demographic characteristics. The rsearch findings would be relevant in policy formulation geared towards strengthening financial resilience and socio-demographic adaptation to variability in climate and food security of vulnerable inhabitants of coastal communities in South-East of Nigeria.

Conceptual Framework: The Food and Agricultural Organization - Food Insecurity and Vulnerability Information Management Systems (FAO-FIVIMS) framework and the Sustainable Livelihoods framework helped in understanding the linkages among various food security dimensions and factors influencing them at various levels (FAO, 2008). As shown in Figure 1, food security has four dimensions: food availability, accessibility, utilization and stability. A state of food security implies that households have sufficient food; have physical and economic access to the food they need and that food is efficiently utilized. Stability emphasises the importance of having to minimize the risk of the negative effects on the other three dimensions (FAO, 2008). Food insecurity exists whenever there is a decrease in any of these dimensions which brings in the concept of vulnerability. The degree of vulnerability of households is determined by the degree to which they are affected or exposed to risk factors and their ability to cope with variability in climate (IPCC, 2007). Vulnerability comprises of adaptive capacity factors (financial access, financial inclusion, income, education, and access to information) which reduce vulnerability; exposure and sensitivity factors (flood frequency and severity, flood awareness, location) which increase vulnerability.

Flooding as a phenomenon has negative effect on food availabilty through reducing crop harvest and farm income; damaging farm/household assets; destroying road, food and farm storage facilities; and polluting streams. Adaptive capacity and coping strategies adopted by households help to enhance household food security in addition to cushioning

the effects of flood-induced food insecurity (IPCC, 2007). Sustainable food security is however achieved when there is an improved over time on the four dimensions of food security and adaptation strategies (FAO, 2008).

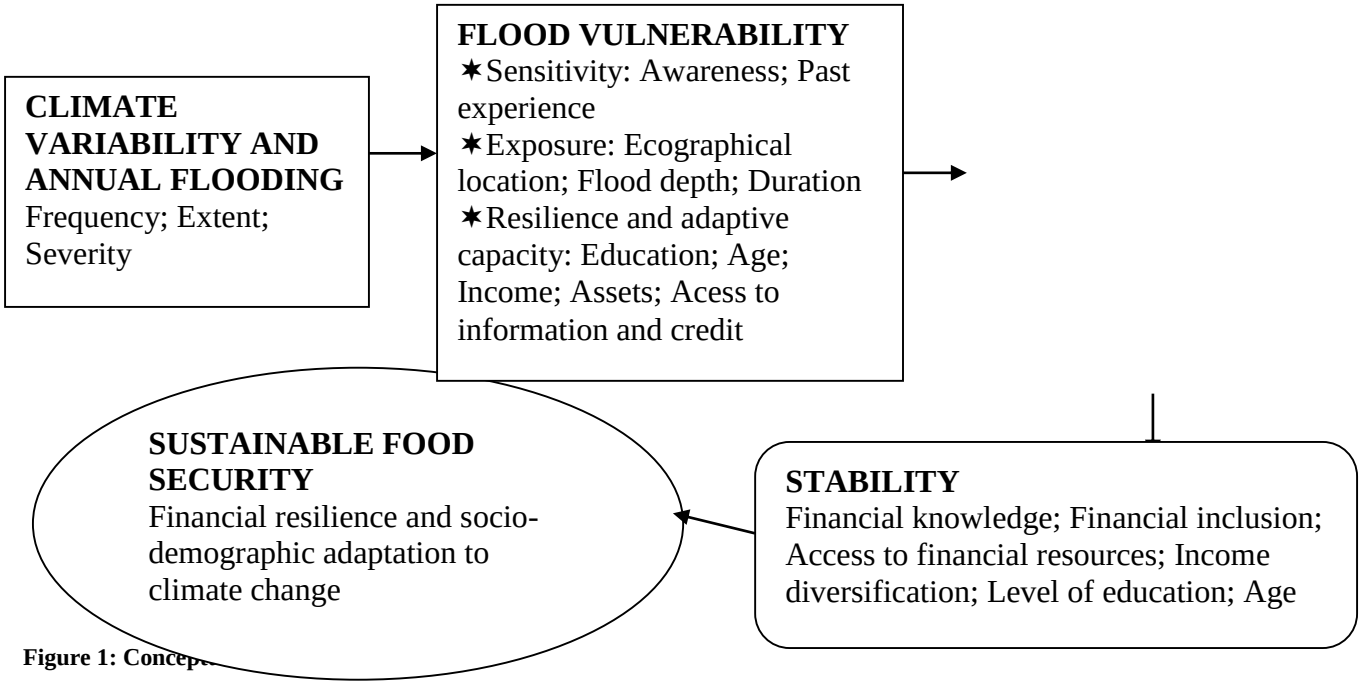

Figure 1: Concep

Source: *Conceptualized by the authors, 2023*

Figure 2: Topograph of South-East Region, Nigeria

Source: Dept. of Geography and Meterology Lab., UNN (June, 2023)

Exploration Survey: The researchers carried out a preliminary survey by visiting the study communities and the stakeholders were sensitized on the purpose and usefulness of the study. The outcome of the survey was used in developing the questionnaire and other research instruments and to select the sample for the study.

3.3 Study Population

The study population is comprised of two South-East states that easily affected by over-flow from the River Niger. The two states are Anambra and Imo states. Two local government areas were selected from each state making a total of four local government areas. The population of the four selected Local Government Areas (LGAs) according to the 2006 population census figures, are Anambra East (152,149); Ogbaru (223,317); Oguta (142,340) and Ohaji/Egbema (182,891) (National Population Commission, 2010).

Figure 3: Selected LGAs.

Source: GIS Unit, Dept. of Geography, UNN (June, 2023)

Sample and Sampling Techniques: The survey methodology was used in the study, and questionnaire designed to obtain respondents view on their vulnerability to flooding and its effects on their livelihood. Likert 5 point scale ranging from 1 (strongly disagree) to 5 (strongly agree) was employed to assess the variable's significance. Likert (1932) developed the theory of measuring attitudes by askingrespondents to rate several statements about a topic based on how much they consented with them, thereby tapping into their perspectives. This ordinal scale was to assess levels of agreement, and disagreement. The questionnaire was designed to capture financial and socio-demographic characteristics of the respondents.

Multi-stage random sampling technique was employed in determining the sample size. The first stage involved random selection of two states (Anambra and Imo) from the five states in the South-East of Nigeria. The second stage involved selsecting two local governments that its inhabitants resides along the River Niger or its tributaries and are highy vulnerable to flood and variability in climate and were assessed to be severely ravaged in the study area by the 2012 and 2022 flood, termed the most devastating floods in Nigeria (Oguntola, 2022; Maclean, 2022). These LGAs are Ogbaru and Anambra East LGAs in Anambra state, and Ohaji/Egbema and Oguta LGAs in Imo State. In each of the LGA's, two (2) communities (one being the LGA headquarters) was purposively selected, giving a total of four (4) communities for each state and eight (8) communities for the two (2) States.

A target population of seven hundred thousand, six hundred and ninty-seven (700,697) respondents were estimated out of which four hundred (400) respondents were selected randomly using stratified random sampling technique. The sample size was determined using (Yamane, 1967) formulae represented by: $n = \frac{\mathrm{N}}{1+N(\propto)^2}$

Where the:

• Desired sample size is represented by n

• Margin of errors (0.05) at 95% level of confidence is represented by α

• Constant (μ) is 1

• Total population is represented by N (**Anambra East (152,149); Ogbaru (223,317); Oguta (142,340) and Ohaji/Egbema (182,891) = 700,697**)

$$n = \frac{700{,}697}{1 + 700{,}697(0.05)^2}$$

$$n = \frac{700{,}697}{1 + 700{,}697(0.0025)}$$

$$n = \frac{700{,}697}{1 + 1751.7425}$$

$$n = 399.77 \approx 400$$

Data Collection: Data were grouped into two - primary and secondary. Primary data were obtained using questionnaires (Household Survey, Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs). The secondary data are rainfall (2000-2022) data collected from the Nigerian Meteorological agency, Lagos (NIMET).

Data Analysis Techniques: The data were analyzed using SPSS. Households' financial and socio-demographic vulnerability were calculated on the basis of five variables: 1) Annual crop harvest, 2) fish capture, 3) trends in income, 4) trends in income considering future climate change scenarios, and 5) the minimum income leading to abandonment of farming due to flooding. The summed value of those five variables was used to create an individual index of financial and socio-demographic vulnerability, ranging from 1 (lower vulnerability) to five (higher vulnerability).

The financial and socio-demographic vulnerability increases with the value of the index. Demographic data (gender, age, and level of education) were analyzed using descriptive statistics such as frequency and percentages. Kruskal-Wallis was used with Bonferroni test to check for any differences in farmers' age, farmers' experience, household size, number of household members employed, education level, farmer and household crop/fish dependencies, and income trends.

RESULTS AND DISCUSION

Demographic and Financial Characteristics of Respondents:Sex, Age and Marital status: The sex, age and marital status of heads of households as well as years each household heads lived in the area are shown in Tables 4.1 and 4.2. Households were interviewed and their responses were recorded and analysed using percentages as shown in Table 4.1. The results show that vulnerability decreases with increasing financial support, off-farm incomes, age, level of education, pre-flood awareness, group or association membership, private land ownership, sufficiency in food production, available storage facility, use of fertilizer, receipt of food/aid in time of emergency, phone and canoe ownership. 90% of the young households were highly vulnerable, while 65% of the less vulnerable households had their households' heads in the ages of 61 and 70 years. None of the respondents had flood or property insurance cover. This is in line with the result obtained by Green *et al.*, (2021) who found that diversification of income was one of the key factors involved in developing different adaptive responses and Biggs, Peterson and Rocha, (2018) who discovered that financial and socio-demographic thresholds for farmers in the coastal areas can be extremely useful to detect early signals of regime shifts, traps or collapses.

Table 4.1: Distribution of financial and demographic factors influencing household vulnerability

Demographic/financial variable	Description	Household vulnerability level (in Percent %)			Total
		Less vulnerable	Moderately vulnerable	Highly vulnerable	
Age	*21-30 years*	1	9	90	30
	31-40 years	30.2	10.8	59.0	75
	41-50 years	52.4	1.0	46.6	95
	51-60 years	52.4	1.2	46.4	100
	61-70 years	65.0	5.0	30.0	85
	71 years & above	40.0	20.0	40.0	15
Group/cooperative membership	*No*	19.5	3.2	77.3	118
	Yes	60.5	15.7	23.8	282
Storage facility	*No*	30.0	8.6	60.4	258
	Yes	90.8	1.4	7.8	142
Food/aid receipt	*No*	43.3	3.3	53.4	299
	Yes	35.4	4.6	60.0	101
Flood/property	*No*	9.9	14.2	75.9	400

insurance policy	*Yes*	0	0	0	-

Source: Authors' computation, 2023

Table 4.2: Distribution of marital status of heads of households *Source: Authors' computation, 2023*

Characteristic	Description	Frequency	Percentage (%)
Sex	Male	346	86.5
	Female	54	13.5
	Total	400	100
Age	21-30 years	42	10.5
	31-40 years	75	18.75
	41-50 years	100	25
	51-60 years	112	28
	61-70 years	62	15.5
	Above 70 years	9	2.25
	Total	400	100
Marital status	Single	0	0
	Married	323	80.75
	Divorced	20	5
	Separated	9	2.25
	Widowed	48	12
	Total	400	100

Table 4.2 shows that 86.5% of the households are headed by male folks, while 13.5% of the households are headed by female. The responses also show that 87.25% of the household heads were between 31 and 70 years of age, 10.5% were between 21 and 30, while 2.25% were above 70 years of age., . However, of the 13.5% female headed households, 12% respondents are widowed. Literacy of household heads Table 4.3 shows that 25.8% did not receive formal education, while about 5% attended higher education.

Table 4.3: Educational Qualifications of Household heads

Characteristics	Description	Frequency	Percent (%)
Educational qualification of heads of households	Non formal	103	25.8
	FLSC	115	28.7
	SSCE	98	24.5
	NCE/OND	64	16
	B.Sc or equivalent	17	4.3
	M.Sc or equivalent	3	0.7
	Total	400	100

Source: Authors' computation, 2023

Income

Monthly income differs among heads of households. 20.8% of household heads earned on the average less than ₦30,000.00 monthly. Farming (crop/fish farming) constitute the major source of livelihood. Other sources of livelihood include petty trading businesses, hunting, and civil service. 9% of the respondents earn ₦60,001 to ₦75,000 monthly, while only about 3.7% respondents earn up to ₦105,001 and above monthly.

Table 4.4: Monthly Income distribution of Households

Income (₦)	Percent (%)	Cumulative Percent
<30,000	20.8	20.8
30,001-45,000	37.0	57.8
45,001-60,000	22.0	79.8
60,001-75,000	9.0	88.8
75,001-90,000	6.5	95.3
90,001-105,000	1.0	96.3
105,001 and above	3.7	100.0
Total	100.0	

Source: Authors' computation, 2023

Households' adaptation strategies to flooding: Table 4.5 shows the overall percentage distribution of the different adaptation strategies by households. Change in seasonal migration recorded the highest number of households (25.5%), followed by elevating buildings (20.5%), building makeshift houses (20%), while building small bridges or creating pathways for flood water recorded the lowest (3%), and having flood/property insurance policy is zero in the distribution of the adaptation strategies to flooding. Seasonal migration occurred between August and October in areas with river channels and flood plains, and this occurred mostly in Atani, Oguta and Ossomala where severe flooding occured. The results are in consonants with Ozoh (2020) who found that flood had devastating impact on people's critical socio-economic livelihoods such as agriculture, health, education, water, properties and assets in Ogbaru local government area of Anambra state; Abubakar, *et al.*, (2020) that discovered that thousands of hectares of farmlands and other properties have been destroyed by flood over the years in the flood plain of River Benue in the Adamawa state; and Ebuzoeme (2015) who concluded that the impact of the flooding in six Communities of Awka (Agulu, Amaenyi, Ezi-Awka, Amikwo, Ifite and Nkwelle) are the same, and they include road congestion, accident, damage of buildings, destruction of properties, health problems,
reduction of aesthetic beauty of the environment, increase in poverty level and death.

Table 4.5: Percentage distribution of the adopted strategies to flooding

Description	No. of households	%
Seasonal migration	102	25.5
Change in planting season	40	10
Digging runoff collection pits	20	5
Elevating buildings	82	20.5
Building makeshift houses	80	20
Joining cooperatives and othe social groups	20	5
Income diversification	20	5
Early harvesting	24	6
Building small bridges and creating flood water pathways with bamboos	12	3
Having flood/property insurance policy	0	0
Total	400	100

Source: Authors' computation, 2023

Households' resilience strategies to flooding : Resilience describes how a community, household or person is able to withstand climate change events or "bounce back" from a disaster event (Epstein, DiCarlo, Marsh, Ray & Måren,

2017). The recovery period in the study area is presented in Table 4.6. It shows a disproportionate recovery period from flood disaster across households in the study area. In all, 32 households recovered within 1 to 6 months, while 105, 127, 86, and 50 households recovered within 7 to 12, 13 to 18, 19 to 24, and above 24 months respectively. The observed flood recovery period may be attributed to the differentials in demographic and financial characteristics of the households.

Table 4.6: Flood recovery period by households in each community

Community	Total					
	1-6 months	7-12 months	13-18 months	19-24 Months	Above 24 months	
Atani	5	13	15	12	5	50
Ossomala	4	14	15	11	6	50
Otuocha	6	16	14	10	4	50
Igbariam	3	13	17	11	6	50
Oguta	3	15	15	8	9	50
Ezi-Orsu	4	12	16	11	7	50
Mmahu	3	10	18	11	8	50
Opuoma	4	12	17	12	5	50
Total	32	105	127	86	50	400

Source: Authors' computation, 2023

4.5 Indigenous Early Warning Prior to Climate-Related Events/Disasters

Indigenous knowledge and early warning sign were investigated and recorded in table 4.7.

Table 4.7: Indigenous Early Warning Prior to Climate-Related Events/Disasters in Riverine Communities of the Study Area

Measures	Atani %	Ossomala %	Otuocha %	Igbariam %	Oguta%	Ezi-Orsu%	Mmahu%	Opuoma %	Total 100%
Singing of birds	56.70	65.20	73.48	47.03	68.34	54.90	67.35	52.68	60.17
Infestation of insects pests	51.22	57.91	55.73	60.21	62.09	62.87	58.00	61.81	58.73
Glow-worming	36.94	38.42	43.24	42.33	48.22	39.80	46.09	45.04	42.51
Changing of water colour	74.51	71.29	75.33	72.99	71.41	72.67	73.83	70.93	72.87
Floating of leaves	76.76	60.17	71.58	68.60	69.90	73.24	70.31	72.08	70.33
Evolving of wild animals	31.98	27.99	44.21	31.77	33.68	30.00	31.29	41.88	34.10
Consecutive rainfall	79.96	78.91	78.53	73.74	80.34	78.93	82.11	76.20	78.59
Media information	19.13	15.56	22.20	20.11	19.58	18.00	13.42	16.00	18
Meteorological agents awareness	18.23	4.64	7.00	23.20	17.35	6.51	9.86	9.21	12

Table 4.7 shows that 60.17% of the households reported singing of bird as flood indicator, while 58.73% used infestation of insect pests to predict flood occurrence. Records of other notable early warning signs that heralds climate change and flooding that the households rely on are Glow-worming 42.51%, Changing of water colour 72.87%, Floating of leaves 70.33%, Evolving of wild animals 34.10%, Consecutive rainfall 78.59%, Media information 18%, and Meteorological agents awareness 12%.

Discussion: The study results demonstrated that higher financial and socio-demographic vulnerability was closely correlated with less farming experience and the size of households. Farmers with a long farming experience have dealt with different situations in the past, developing a diverse portfolio of solutions in their financial and socio-demographic memory. Lower economic vulnerability was related to a greater number of households' members, because diversifying incomes from other activities including public pensions for retirement helped in adaptation to climate change. This is consistent with the findings of Green *et al.,* (2021), who conducted a global meta-analysis to analyze impacts of climate change in SSF and found that diversification of income was one of the key factors involved in developing different adaptive responses.

Another key finding was the empirical demonstration, that 20.8% of the farmers' earn less than ₦30,000 per month. This income cannot sustain or maintain farming activity and cover fixed costs. This result is important because management strategies that explicitly include thresholds and integrating them into farm management policies should consider the income levels of the people as it has been shown to be more effective in achieving public policy goals than strategies that do not consider explicit thresholds (Kelly, Erickson, Mease, Battista, Kittinger & Fujita, 2014). Identifying financial and socio-demographic thresholds for farmers in the coastal areas can be extremely useful to detect early signals of regime shifts, traps or collapses, which also help to create new windows of opportunities for transition to desirable conditions by households (Biggs, *et al.,* 2018).

Similarly, this study provided evidence that farmers' behaviourial pattern responded to changes in environmental conditions by reducing household expenses and complementing farming with other formal or informal jobs to compensate for the financial losses. These individual strategies assisted in building resilience and adaptive capacity to deal with not only climate change impacts, but also deal with financial and socio-demographic shocks (Villasante, Tubío, Gianelli, Pita & García-Allut, 2021).

Also in this study, it was found that the tendency of an increase in the social involvement of farmers' in farmers' cooperative associations is useful. Our results indicted that financial and socio-demographic vulnerability was very high (77.3%) amongst farmers who were not involved in farmers' cooperative associations. A higher involvement in the organization of farmers' cooperative associations allows for a greater exchange of information on the state of the banks and other financial institutions credit access. Cooperative associations enable farmers have access to credit facilities because fund managers trust the group more than the individual who may not have security for bank credit. Successful partnerships can only occur when the farming community is empowered and organized, and all participants can take advantage of short and long term benefits of cooperation. Farmers who share common objectives, values, norms, beliefs, and who trust in each other and in the group, have a better chance of realizing resilience and adaptation (Grafton, Doyen, Béné, Borgomeo, Brooks & Chu, 2019).

collaborates with the findings of Adam, Ghosh and Runeson (2022). The low percentage reported in this study may be ascribed to education level as well as lack of access to

Indigenous knowledge and early warning signs were also investigated and recorded. 60.71% of the farmers' reported using of bird as flood indicator for early warnings prior to flood. Dube, Nhamo and Chikodzi (2021) reported the behaviour of certain animal species, continuous crying and unsettledness of *inkanku* (a rain-making bird) to predict the severity of forthcoming rains that would result in flooding.Infestations of insect pest (58.73% respondents) were one of the early warnings used in predicting flood occurrence. People affected by floods in past years can now predict flooding with their indigenous knowledge and move their valuables out of flood prone houses (Ozoh, 2020). However, the results obtained in this study are contrary to the report by Efobi and Anierobi (2013) that people could not predict flooding in riverine communities of Omambala and other areas in Anambra state. The contrary result recorded may be ascribed to the fact that the communities had never witnessed flooding of the magnitude experienced in 2012 and 2022. The 18% of farmers receiving early warning information from media source like television and radio broadcasts and 12% meteorological agents' government officials or settlement-based groups were relatively low. This also

information gadgets like radio and televison sets and eratic power supply in Nigeria.

Conclusion: Although developing financial resilience capacities and socio-demographic adaptive strategies helps

to deal with impacts of climate change, several threats to the sustainability of farmers in coastal communities remain. The decrease in abundance and increase in prices of farm products and the high level of dependence on public and private aid to ensure reasonable income for farmers are disincentive to developing financial and socio-demographic adaptation and resilience to variability in climate and flood impacts. In addition, the inhabitants of coastal communities in the study area are faced with the problem of generational transition to work, that would have ensured not only jobs and revenues increase, and sustaining female and young population in coastal communities, but also would have assisted in retaining the traditional knowledge of financial and socio-demographic memory of associated practices, experience and values. Government sustainable policies, strategies and programmes that will ensure social security, provide food safety nets, insurance scheme, and micro-credit access to the coastal farming communities and at the same time enhance income diversification, cooperative associationship, increase knowledge about climate change, improve alternative skills and involve farmers' in adaptation planning are imperative in ensuring financial resilience sand socio-demographic adaptation to minimize food insecurity.

Recommendations: Absence of storage facilities was among the major reason for agricultural commodity crop losses during flood in coastal communities as many were forced to harvest early to avoid impending flood damages. Thus, construction of standard-mega-capacity storage facilities (e.g. silos for grains) at flash points in the coastal communities would help households store their farm produce with a multiplier effect on reducing crop wastage and economic losses during flooding, and improving food security. The survey showed that most households had access to little or no loan/credit facilities. Economic empowerment of these households will increase productivity as it was found out that land availability was not a problem but inadequate funds to cultivate the available land. This could be realised by incorporating into policies micro-credit schemes for agrarian households/communities and ensure their implementation. Social protection fund/internally displaced persons (IDPs) camps should be incorporated into the state's palliative/flood mitigation measures to enable victims settle after flood disaster.

Similarly, a substantial number of household heads were not members of any farmers' association or groups, thereby missing out on the benefits of such associations. Thus, households in riverine farming communities should be encouraged to join social networks like organized cooperatives to encourage savings and reduce their vulnerabilities to flooding and food insecurity. This can easily be achieved through sensitization programmes by government agencies. There was no recorded flood insurance policy among the sampled households, therefore it is recommended that households should be sensitised on flood insurance policy and importance of having their properties insured. This will be feasible and sustainable if the flood insurance is subsidized for the farmers by the government. Strengthening of Nigeria Incentive-Based Risk Sharing system for Agricultural Lending (NIRSAL) initiative will reduce poverty, increase access to credit, improve productivity and food security in the coastal communities.

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