

# **SOCIO-ECONOMIC DETERMINANTS OF CLIMATE CHANGE VULNERABILITY IMPACTS AND ADAPTIVE CAPABILITIES OF RESIDENTS OF RIVERINE COMMUNITIES IN NIGERIA**

By

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## **Extended Abstract**

The Riverine communities in Nigeria that cut across the six geo-political zones are facing negative climate change impacts. These communities have over 10,000 km of inland waterways encompassing rivers, creeks, lagoons, lakes (natural and man-made), and intra-coastal water whose source is the two main rivers Niger and Benue. The residents engaged in farming, fishing, and transportation (ferry) activities for the movement of goods and services; as means of livelihood. Due to the homogeneity of the Riverine population across Nigeria, vulnerabilities and adaptive capabilities study was carried out among Lagos and Ogun Riverine communities in Southwestern Nigeria. To assess the climate change impacts and associated vulnerabilities, a comparative analysis was carried out for five hundred (500) farmers, five hundred (500) fishermen, and one hundred (100) ferrymen, and their adaptive capabilities were determined in Lagos and Ogun State. Mixed methodologies of the household survey, formal interview, and

informal interactions to elicit information from fishermen, farmers, and ferrymen from each study area. The responses and descriptive statistics analysis of the data collected showed that the loss of income, dwellings, livelihoods, and forced displacements are the elements of economic, social, physical, and environmental vulnerabilities facing the residents as a result of climate change impacts with consequences of direct and indirect losses. The results on the adaptive capacities, to which the impacts of climate change can be reduced among the communities, showed that the residents rely on their traditional and local knowledge to handle and cope with the impacts, formation of cooperative and thrifts association to boost their economic activities among others. The study concluded that there is a need for anticipatory, reactive, and institutional measures with the government and relevant non-governmental organizations getting involved in reducing climate change vulnerability impacts. More so, there is a need for government presence and intervention in these communities to support socio-economic activities that form the people's livelihood and indirectly contribute to National Development. Then, the development of traditional and local indigenous knowledge models is proposed to tackle the climate change impacts in these communities.

Keywords: Adaptive, Climate change, Socio-Economic, Vulnerability, Riverine, Nigeria

## **Introduction**

The scale and nature of projected climate changes vary across the world with alarming data. The situations necessitate local analyses as well as timely and effective responses to ensure resilience to such changes and adaptation of human systems to these changing climatic conditions; higher temperatures and changes to other climate variables leading to sea level rise as well as changes in wave climate, coastal environments, availability and quality of water for households, agriculture and other water demands.

An increased hazard of extreme events such as storms, heavy rainfall, and periods of drought and water scarcity is happening. The challenges of managing risks to population and infrastructure from sea level rise and changes in storm and rainfall intensity, ensuring food and water security in changing climates and societies required all segments of the population.

Since time immemorial people of different societies all over the world are inextricably attached to their natural environment. Their environment is indispensable, not only for their

survival and security but to preserve their identities, traditions, and socio-cultural settings. The hydrosphere, water bodies as one of the components of the natural environment serving man with its various functions is the theme of the study.

However, the present study focused on the multifunctional roles of water; farming, fishing, and ferry and to address climate change impacts affecting the people that depend on these water bodies as their place of abode and/or means of livelihood (Moore, Udom, Ngobiri, & Osuji, 2020), (Babatunde, 2020). In Nigeria, residents of Riverine communities are typical people that depend on water bodies (Eyankware & Ephraim, 2021), (Olopade & Dienye, 2020).

The communities cut across the six geo-political zones that are facing negative climate change impacts of extreme intensified rainfall; resulting in flooding, increased in level of water bodies, loss of biodiversity, forced displacement or migration, and in extreme situations loss of source income, properties and life (Haider, 2019), (Olagunju, Adewoye, Adewoye, & Opasola, 2021), (Ani, Anyika, & Mutambara, 2022).

Furthermore, the residents of these communities depend on over 10,000 km of inland waterways encompassing rivers, creeks, lagoons, lakes (natural and man-made), and intra-coastal water whose source is the two main rivers Niger and Benue. The residents engaged in farming, fishing, and transportation (ferry) activities for the movement of goods and services; as means of sources of livelihood.

There are significant studies on climate change carried out in Nigeria focusing on different aspects. Ikpe (2018) assessed the rural farmers' perception and adaptation strategies to climate change in Katcha Local Government Area, Niger State. The study concluded that the climatic characteristics of the study area affect crop production while adaptation strategies have a significant contribution to crop production in the area that will depend on government involvement and collaboration (Ikpe, 2018).

Furthermore, rural farmers' vulnerability and adaptive capacity to climate change in Girei Local Government Area Adamawa in the North-East Part of Nigeria. The majority of the communities surveyed were highly vulnerable to climate change, while the communities were found to possess a moderate capacity to cope with climate change effects. This is due to their asset accumulation, access to farm inputs, irrigation potentials, literacy level, and infrastructural and institutional availability (Ambrose & Mohammed, 2020). However, the outcome of a study carried out by Basiru *et al.*, (2022) on Climate change and climate justice in the South-South part

of Nigeria concluded that the climate change adaptation activities did not include or recognized female folks in addressing climate change issues among forest-based communities, to reduce emissions from deforestation and forest degradation leading to climate change impacts (Basiru *et al.*, 2022).

In the middle belt part of Nigeria, Olagunju *et al.*, (2020) carried out a study titled: Climate Change Impacts on Environment: Human Displacement and Social Conflicts in Nigeria. The herdsmen (pastoralists) and farmers' competition for land and water as a result of climate change impacts, creating social conflicts, forced migrations, and destruction of properties and farmland. They believed that climate change mitigating and adaptation measures need to be addressed by the relevant government stakeholders (Olagunju *et al.*, 2020).

However, the present ongoing study is determined to explore the Climate Change Vulnerability Impacts and Adaptive Capabilities of Residents of Riverine Communities in Nigeria with a focus on Fishermen, Farmers, and Ferry men in Lagos and Ogun Southwest Nigeria. Though, Amos, Akpan, and Ogunjobi, (2015), examined the households' perception and livelihood vulnerability to climate change in a coastal area of Akwa Ibom State, Nigeria. The results showed that the residents were vulnerable to changes in climate variables. But lack of adequate finance was militating against their adaptations. The study concluded that support from government and non-governmental organizations must be sought (Amos, Akpan, and Ogunjobi, 2015).

Then, Medugu, Majid, & Leal Filho, (2014) assessed the vulnerability of farmers, fishermen, and herdsmen to climate change using a case study from Nigeria but the specific location was not identified in the study. The results indicated that climate change impacted crop production with more than a 50% reduction in production, but no significant change occurred to fish production. But, the affected people in the study area do not have good adaptive measures to the current and expected changes (Medugu, Majid, & Leal Filho, 2014).

Recently, Akinsemolu and Olukoya, (2020) carried out a vulnerability study of women to climate change in the Ilaje community in Ondo State, a coastal region of Nigeria. The study concluded that the economic, political, educational, and environmental factors are at play in the vulnerability of women to climate change in the study area. The study concluded that the vulnerability of women to climate change can be addressed and reduced by understanding the associated factors that are responsible for the vulnerabilities (Akinsemolu, & Olukoya, 2020).

Therefore, the study aimed to assess the climate change vulnerabilities impacts and adaptive capabilities among Fishermen, Farmers, and Ferrymen residing in the Riverine communities of Lagos and Ogun State. The study further determined if the demographic characteristics of residents influenced their vulnerabilities and adaptive capacities as individuals or communities. Then, the study will propose an adaptive model(s) for addressing climate change vulnerability impact and adaptive capacities in the study area and the model(s) can be applied in other parts of Nigeria.

### **Methodology**

Mixed methodologies of the household survey, formal interview, and informal interactions, fieldwork (traveling with fishermen and ferrymen) were adopted to elicit information from fishermen, farmers, and ferrymen from selected Riverine communities in Lagos and Ogun state in Southwest Nigeria. One thousand and hundred (1100) respondents took part in the study (500 fishermen, 500 farmers, and 100 ferry men). The validated research instrument, the questionnaire was used to acquire the socio-economic variables - sex, age, year of experience, average income, level of education, marital status, and the number living in the household of the respondents that were randomly selected across Iyaafin, Badagry, Ijofin, Onfo, Iwopin, Ode-Omi, Epe, and Key Questions raised were (1) Is climate or weather negatively affect your occupation? (2) Are you safe now when working unlike before? (3) Is your income affected by the weather and climate? (4) Do you consider leaving the job because of weather and climate change? (5) Do you have a fear or concern with your occupation? (6) Are you experiencing any difficulties in coping with the situations? (7) What are the solutions to the problem? (8) Do you want government and external support? (9) What support do you want? The data collected were analyzed by descriptive statistics to identify similar responses from the respondents.

### **Results and Discussion**

The results from descriptive statistical analysis of the data collected showed that over ninety-five (95%) of the respondents indicated that the reduction or loss of income, dwellings, and livelihoods were major elements of economic, social, physical, and environmental vulnerabilities facing the residents as a result of climate change impacts with consequences of direct and indirect losses. The loss of farmland as a result of flooding and increased water bodies level, loss of life due to boat capsizing due to extreme weather conditions coupled with lack of

infrastructure, aging boats that cannot withstand, the extreme weather conditions on the waterways, while the responses of the fishermen were decreases of harvest, loss of some species of fishes, and those practicing aquaculture closed to water bodies do experience loss when flood does wash away the fishes they rear.

**Table 1: Showing the socio-economic characteristics of the respondents**

Respondents	Gender		Educational Background		Monthly Income (\$)	
	Male	Female				
Fishermen (500)	345 (69%)	155 (31%)	No formal Education	301 (60.2%)	1-22.57	93 (18.6%)
			Primary Education	102 (20.4%)	22.58-225.73	401 (80.2%)
			Secondary Education	97 (19.4%)	Above 225.73	06 (1.2%)
Farmers (500)	300 (60%)	200 (40%)	No formal Education	41 (8.2%)	1-22.57	87 (17.4%)
			Primary Education	125 (25.0%)	22.58-225.73	397 (17.4%)
			Secondary Education	334 (66.8%)	Above 225.73	16 (3.2%)
Ferryman (100)	95 (95%)	05 (05%)	No formal Education	85 (85%)	1-22.57	64 (64%)
			Primary Education	10 (10%)	22.58-225.73	36 (36%)
			Secondary Education	05 (05%)	Above 225.73	-

The results as displayed in the table 1 above showed that the incomes of the respondents are very low due to the effects of climate change on their livelihoods activities- farming, fishing and ferry activities. Then, the level of education qualifications are another factors that make the respondents vulnerable among others.

The results on the adaptive capacities, to which the impacts of climate change can be reduced among the communities, showed that the residents rely on their traditional and local knowledge to handle and cope with the impacts, the do argument on the income level through formation of cooperative and thrifts association to boost their economic activities among others.

**Table 2: Showing the responses to the questions asked to elicit information from the respondents**

<b>The Questions Asked</b>	<b>Yes</b>	<b>No</b>
(1) Is climate or weather negatively affecting your occupation?	1077	23
(2) Are you safe now when working unlike before?	123	977
(3) Is your income affected by the weather and climate?	1087	13
(4) Do you consider leaving the job because of weather and climate change?	97	1003
(5) Do you have a fear or concern with your occupation?	990	110
(6) Are you experiencing any difficulties in coping with the situations?	995	105
(8) Do you want government and external support?	1020	80

The questions asked from the respondents as shown in the table 2 above showed that weather and climate change effects making the residents vulnerable. They have fear for losing their source of income and experiencing difficulties in coping with the situations of loss of income, place of abode among others but not read to leave or abandon their source of livelihoods as answer to question 4 indicated. The majority (995) (90.5%) believe that they find the situations difficulty to copy and 1020 (92.72%) respondents want and expecting government and external support.

### **Conclusion**

The study concluded there that there is a need for anticipatory, reactive, and institutional measures with the government and relevant non-governmental organizations getting involved in reducing climate change vulnerability impacts. More so, there is a need for government presence and intervention in these communities to support socio-economic activities that form the people’s livelihood and indirectly contribute to National Development.

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