Nigerian Agricultural Policy Research Journal (NAPReJ) Agricultural Policy Research Network (APRNet)
Vol. 13, Issue 01. Website:http:// www.aprnetworkng.org ©2026

NAPReJ ISSN 2536-6084 (Print) & ISSN 2545-5745 (Online)

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Promoting Community Awareness Adaptation and Action for Climate change in Southern Nigeria

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ARTICLE INFO

Keywords:

Climate Change, Community-Based Adaptation, Vulnerability

ABSTRACT

Climate change is a global challenge because of its multifaceted impacts on the environment, food security and livelihoods. Rural farming communities are amongst the most vulnerable to climate change as agriculture depends on weather. Previous studies have shown that in southern Nigeria, flooding and the attendant erosion of surface soils due to run-off are the major impacts of climate change. Although adaptation is the first line response in developing countries, the contextual socio-economic environment under which households and rural communities are expected to adapt have not been fully examined. Also an examination of community-based action for climate change has scarcely been studied hence this study. Two communities in southern Nigeria were purposively selected based on erosion and flood hazards. Structured questionnaire and participatory mechanisms were used to elicit information. It was found that at the community level, while coping strategies adopted were identified, there was a dire lack of capacity to adapt due to limited access to knowledge on climate smart technologies. Amongst the respondents, 69.6% in Afikpo and 50% in Ndoni stated that they did not have ease of access to climate change information. Community leadership role on climate change was very weak in both communities as only 17.4 % in Afikpo and 5% in Ndoni felt that their community leadership provided resources for climate change adaptation. The paper recommends capacity building for community leaders on climate change adaptation and the promotion of action-oriented research that would promote knowledge and climate smart technologies.

1.0 Introduction

Climate change refers to long term changes in climate systems of the earth, measured by variation in average temperature observed over long period of time like decades or centuries. (Bhattacharya, 2019; Verma, 2019). Climate change is expected to have severe effects on the populations of developing countries because many of these depend heavily on agriculture and other sectors dependent on environment for income, and have large impoverished rural populations which rely on agriculture for subsistence (Seaman et al, 2014; UNEP, 2013; FAO, 2017; Chukwuone & Amaechina, 2021; Amaechina et al, 2022; FAO 2022; Vishnoi and Goel, 2024). The economies of nations in Africa are largely dependent on natural resources, agriculture and other sectors that respond to climate variability (UNEP, 2013; Abdul-Razak and Kruse, 2017), thus compounding the development challenges already faced by the continent.

According to Federal Ministry of Environment (FME) (2020), Nigeria is vulnerable to climate change. It is projected that a temperature increase of 0.04^0C will be experienced in Nigeria yearly from 1981/2000 until 2046/2065 period, and getting to 0.08^0C per year after 2050. Within this scenario, rainfall is expected to increase by an average of 15 cm annually in the South but reduce at an average rate of 7.5 cm annually in the North (FME, 2011; FME, 2020). The implications of these changes if no adaptation occurs could cost between 6% and 30% of Nigeria's GDP by 2050, which is put at between USD 100billion and USD 460 billion (FME, 2020; DFID, 2009).

Climate change has already significantly impacted agriculture (Lobell *et al*, 2011) and is expected to further impact it (FAO 2013).

NAPReJ ISSN 2536-6084 (Print) & ISSN 2545-5745 (Online)

Agriculture, which is a broad term that refers to the production, processing and marketing of crops and livestock from producer to consumer, is a natural resource-based activity. It depends on weather, land and water resources. Changes in climate factors have significant consequences for the agricultural sector. Floods and the consequent erosion of land are among the most important natural factors affecting rural livelihoods in Southern Nigeria. Such events can reverse economic gains through hard work and leave people with irreversible health consequences (Hallegate et al, 2016). Local communities in developing countries are the first to experience the adverse effects of climate change.

According to Moench and Dixit (2004) the root causes of vulnerability are related to human induced changes in hydrological systems, greater economic activity in vulnerable regions and patterns of development that are poorly adapted to the inherent variability of natural systems. These tend to increase the risk for livelihood systems. The Africa Environment Outlook 3 (UNEP, 2013) highlighted the root causes of vulnerability in Africa to include: heavy reliance on agriculture and other nature based livelihoods; limited technologies for coping with the impacts of climate change; the prevalence of drylands; water poor countries getting to water stressed; and reduced ability of governments and institutions to deal with the impacts of climate change and to strengthen resilience of the citizens, particularly the vulnerable groups who are less equipped to deal with the impacts of climate change.

In developing countries, mitigation and adaptation potentials are very high given the already low productivity of agriculture, the high poverty, vulnerability and food insecurity, as well as the harsh direct effects of climate change (Lybbert and Summer, 2010). Adaptation is adjusting to the natural or human system by learning to cope with temperature increases, floods, and other climatic risks and hazards associated with climate change (Reid and Huq, 2007; Judd et al, 2023). Adaptation in the context of human dimensions of global change usually refers to a process, action or outcome in a system (household, community, group, sector, region, country) in order for the system to better cope with, manage or adjust to some changing condition, stress, hazard, risk or opportunity (Judd et al, 2023). According to Bechtoldt et al, (2025), policy makers aiming to promote people's engagement and investment in adaptation should raise people's outcome expectancy and also appeal to people's group identity as it strengthens their collective efficacy. In addition, Sanderson and Curtis (2016), showed that cultural factors are important variables in peoples perception of and attitude towards climate risk. In this regard, community-based adaptation is an important mechanism for addressing climate change impact.

Community-based adaptation (CBA) is a means to address the challenges presented by climate change. Community-based adaptation involves local people in participatory assessment of risks to ascertain the objectives and mechanisms for adapting to climate change (Forsyth, 2013; FME, 2020). Community based adaptation has gained traction as policy makers and scientists have recognized the need to undertake adaptation at the scale where climate change impacts are felt (Puig et al, 2025; McNamara and Buggy, 2016). As argued by Puig et al, (2025) the success of national level adaptation is hinged on three basic principles, of which devolving adaptation decisions to those who are most impacted by climate change is one. A shift in focus of adaptation as a technical, impacts oriented process to a process that focuses on developing adaptive capacity and addressing the social drivers of vulnerability resulted in CBA garnering increased support (McNamara and Buggy, 2016). Community based adaptation promotes the adaptive capacity of the communities to adequately address the impact of climate change (Moench and Dixit, 2004). According to Brooks and Adger (2005) adaptive capacity is the property of a system to adjust its characteristics or behaviour in order to expand its coping range under existing climate variability, or future climate conditions. Adaptive capacity in practical terms is the ability to design and implement effective adaptation strategies or to react to evolving hazards and stresses to reduce the likelihood of the occurrence and the magnitude of harmful outcomes resulting from climate related hazards.

Climate change presents new challenges to ecosystems as temperature and rainfall patterns fluctuate and change the volume and timing of runoff and stream flows (FAO, 2022; Judd et al, 2023). Higher temperature and lower soil moisture leading to increased evaporation rates will add pressure to already stressed river systems (Saft et al, 2016; Judd et al 2023). In southern Nigeria like elsewhere in Nigeria, climate change

ISSN 2536-6084 (Print) & ISSN 2545-5745 (Online)

is taking its toll on ecosystems and livelihoods that are natural resource dependent are at risk.

Successful adaptation requires proactive management (Judd et al, 2023). Although the Nigerian National Adaptation Strategy and plan of Action on Climate change stipulated that all spheres of government including the local governments and community leadership as well as individuals can play a role in ensuring adaptation to climate change (FME 2011), the extent to which these roles have been played has not been adequately studied. An understanding of household and community vulnerabilities as well as adaptation strategies is essential in formulating effective policies in the sector, hence this study. This paper is based on a study tour visit to Unwana, Ogbam and Ndoni communities in Southern Nigeria, by students of the Climate Change Center in University of Nigeria, Nsukka. As part of the study, data was collected through questionnaire administration, focus group discussions and meetings with representative community leaders. The overall objective of this study was to promote household and community adaptation to climate change. The specific objectives were to identify the communities' sources of productive assets; describe the communities' access to and sources of information on climate change; identify the communities' perception of their local environmental issues and identify their perception of the role of their community leaders in climate change adaptation.

2.0 Methodology

2.1 Study Area

The study area of this study/field trip are Unwana and Mgbom in Afikpo North Local Government Area in Ebonyi state of Nigeria and Ndoni in Rivers State.. Afikpo North is the second biggest city in Ebonyi State, which is located in the subtropical belt. It lies between longitudes 7°53′ E and 7°58′ E and latitudes 5°55′N and 5°53′N. The mean annual rainfall ranges between 2040mm to 2190mm and the temperature is between 25°C and 27.2° C (Obiahu & Elias, 2020) and spans an area approximately 240 square kilometers in size (Ebonyi State Agricultural Development Program (EBADEP) 2001) Afikpo North Local Government Area has an estimated population of about 156,611(NPC, 2006).

Ndoni is a community situated in Ndoni District of the Ogba/Egbema/Ndoni Local Government Area of Rivers State. It shares common boundaries with the Egbema Communities and is a predominantly Ibo speaking community. The people are mostly farmers and fisher men/women. The community is richly endowed with natural resources like forests, water bodies, and sharp sand. The community is within the rain and swamp forest ecology, and with moderate humidity, arable land and friendly temperature, possess a favourable climate for agricultural activities. The major agricultural crop grown in the area are cassava, yam, melon, pepper and other vegetables. The wide range of biodiversity in the environment is being threatened by the increased activities of oil exploration and exploitation in the Local Government area and by other anthropogenic factors like increasing urbanisation. The community like most Niger Delta communities have experienced development in infrastructure in terms of roads, electricity and pipe borne water, and small businesses have been established in the area. The major climate change effect is flooding accompanied by erosion.

2.2 Sampling and data collection

In Unwana (Afikpo) and Ndoni, 25 respondents each were randomly selected for the study but after data checking and cleaning, 23 and 20 questionnaire for Afikpo and Ndoni respectively were used for the analysis.

The study trip to Unwana and Ndoni involved collection of data on climate change vulnerability and adaptation. Data on issues related to climate change adaptation, such as access to resources for livelihoods and climate change adaptation, access to information, and coping strategies were collected. Also focus group discussions were conducted in both communities. Representative community leaders from Unwana and Ndoni were invited to a one day interactive session and capacity building event during which the FGD was conducted. Participatory tools like historical trends, and ranking were used to elicit information.

The data collected was analyzed using descriptive statistics like frequencies, percentages and means. The findings are presented in the following sections.

3.0 Results and Discussion

3.1 Respondents Source of Productive assets

Access to productive resources are important determinants of a person's or household's ability to cope with climate change. The major source of

ISSN 2536-6084 (Print) & ISSN 2545-5745 (Online)

productive assets by the respondents was ascertained as presented in Table 1. The core resources of land, water and energy examined were not adequately available to the respondents.

Table 1: Respondents' Source of productive Assets

Attribute	Afikpo	Afikpo	Ndoni	Ndoni
Source of Land				
None	1	4.3	4	20
By purchase	2	8.7	5	25
By inheritance	11	47.8	6	30
Renting	7	30.4	5	25
Gift	1	4.3	-	-
Household Water Source				
River water	3	13.0	10	50
Rainwater	3	13.0	3	15
Pipe-borne water	2	8.7	3	15
Borehole	11	47.8	4	20
Well water in household	1	4.3	-	-
Others	3	13.0	-	-
Major Energy Source for Cooking				
Kerosene stove	10	43.5	6	30
Firewood	12	52.2	14	70
Gas	1	4.3	-	-
Briquette stove	-	-	-	-

Land is a major productive resource (Vishnoi & Goel, 2024; UNEP, 2013). Table 1 shows that land was acquired mainly by inheritance and renting. The implications of these for agricultural commercialization is obvious. Land fragmentation through inheritance is the bane of agricultural development as the economies of scale cannot be applied to small farm holdings (Aslam & Fazal, 2024;Vishnoi & Goel, 2024). Also renting land may not allow the farmers to engage in the most efficient productive systems as tenurial arrangements may be stringent. All these may mean continuous cropping, which exacerbate land degradation and soil erosion.

According to Moench and Dixit (2004), a reliable water supply is essential if communities are to be able to adapt. The table shows that the respondents in both communities have a wide array of supply of water for household activities. In Afikpo the predominant source is borehole. Many households had borehole or wells from which they fetched water. This result agrees with the findings by Amatobi and Agunwamba, (2022), that also reported that major household water source in Afikpo was from boreholes. In Ndoni, the major source is river water. This is surprising as Ndoni is one of the Niger Delta regions with many development projects which includes water infrastructure provision. Yet majority of the respondents stated their major source of water was from rivers. Rainwater is a form of precipitation in which water falls to the earth surface. It is a major source of the hydrological cycle. Rainwater harvesting could be a climate smart technology to reduce run-off which leads to soil erosion (Lepcha et al, 2024). From the study, few of the respondents engaged in rainwater harvesting.

The major energy source indicated by the respondents in both communities was use of firewood. This has serious implications for forest resources and for climate change mitigation, as it entails cutting of trees. None of the respondents used briquette stove which is a climate –smart technology.

3.2 Respondents Access to and source of Information on climate change

According to High Level Panel of Experts on Food Security and Nutrition (HLPE) (2012), information for adaptation and mitigation is an essential element in building resilience and the capacity of populations and nations to anticipate and manage climate change. The ease of access and sources of information on climate change were identified (Table 2).

Table 2: Respondents Access to and source of information on climate change

Category	Afikpo		Ndoni	
Ease of Access to Information				
Yes	7	30.4	10	50
No	16	69.6	10	50
Source of information on CC				
None	6	26.1	10	50
Radio	6	26.1	5	25
Newspaper	4	17.4	1	5
Workshop/Seminar	-	-	1	5
Television	4	17.4	1	5
Others	3	13.0	2	10

Most of the respondents stated that it was not easy for them to access information on climate change.

ISSN 2536-6084 (Print) & ISSN 2545-5745 (Online)

The major source of information on climate change was by radio in both communities. This poor access to information needs to be critically addressed. The FME (2011) stated that to build climate change adaptation into every aspect of national life, people must have knowledge and access to knowledge – of what climate change is, how it is impacting them and how they can cope. In the focus group discussion with the participants, they stated the trends in climate variables and impacts like rainfall, temperature and floods over the past 40 years. They noted that rainfall intensity was increasing, but duration of rainfall was decreasing. In terms of temperature, they agreed it was increasing as the weather was getting hotter. They also noted that incidence of floods was increasing.

3.3 Respondents Perception of Local Environmental Issues

The local environmental issues within the community that can exacerbate climate change impacts were examined. As noted by OECD (2025) environmental challenges are getting increasingly related, with biodiversity loss, pollution, climate change and resources pressures reinforcing one another. The respondent's opinion about local environmental issues were ascertained as presented in Table 3.

The tendency in Afikpo as indicated by the respondents is that household water quality was getting better. This agrees with the earlier result that showed that borehole was the major source of water for the respondents. In Ndoni water for household use as well as from rivers, lakes and streams was getting worse. This is a general trend particularly in Ndoni for all the other environmental variables like air pollution, solid waste management and population of native animal species. In Afikpo, the native animal specie population was getting worse, while respondents viewed solid waste management problem as the same as before.

According to IDRC (2006), Environmental and resource degradation has been widely recognized as a crucial constraint to reducing poverty among the most disadvantaged and marginalized population who reside mainly in rural areas. There is also a relationship between environmental quality and climate resilience of any given community.

Table: 3 Perception of local environmental issues

Category	Afikpo		Ndoni	
Household water Quality				
Much worse	1	4.3	7	35.0
Worse	5	21.7	7	35.0
Same	6	26.1	1	5
Better	11	47.8	3	15.0
Much Better	0	0	2	10.0
Water Quality in Lakes, Rivers and streams				
Much worse	-		9	45
Worse	8	34.8	9	45
Same	6	26.1	1	5
Better	9	39.1	1	5
Much Better	-	-	-	-
Level of Air pollution				
Much worse	-		5	25.0
Worse	9	39.1	7	35.0
Same	5	21.7	7	35.0
Better	9	39.1	1	5.0
Much Better	-		-	
Solid waste Management				
Much worse	5	21.7	7	35,0
Worse	7	30.4	5	25.0
Same	9	39.1	2	10.0
Better	2	8.7	5	25.0
Much Better	-		1	5.0
Population of Native animals				
Much worse	9	39.1	4	20.0
Worse	8	34.8	9	45.0
Same	4	17.4	3	15.0
Better	2	8.7	4	20.0
Much Better	-			

3.4 Role of Community Leadership in Climate Change Adaptation

The respondents' perception of the role of their community leaders in climate change adaptation was examined and presented in Table 4.

The results in the table show a very weak if not absent leadership role in the area of climate change adaptation. This finding agrees with the admission by the participants in the focus group discussion who stated that nothing was being done by their leaders in the area of climate

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change. As observed by HLPE(2012), governments and other actors need to strengthen their capacity for responsive and innovative information collection, management and dissemination systems which can reach everyone especially the most vulnerable groups.

Table 4: Perception of role of community leadership in climate change adaptation

Category	Afikpo		Ndoni	
Where to get Climate related Information	2	8.7	0	0
Suggestions on adaptation options	2	8.7	0	0
Provision of resources for climate adaptation	4	17.4	1	5
Involvement of community in Climate adaptation planning	3	13.0	0	0
Previous participation in decision making				-

4.0 Conclusion and recommendations

This study examined household and community preparedness for adaptation action. It ascertained household sources and access to resources and climate change information. It showed that the respondents lacked access to adequate information on climate change and could not rely on their leaders for direction on how to adapt to climate change, as they were not providing information or resources. Although from the perspectives of the respondents, major climate variables were increasing in magnitude as well as the associated hazards, the respondents didn't have robust measures for adaptation. There is need for concerted intervention in the rural parts of Nigeria, to promote the adaptive capacity of the population through wholistic approaches. The participation of local people in adaptation actions should be promoted. Capacity building for community leaders on climate change adaptation should be embarked upon by State ministries of environment. Also action oriented –research such as this should be enlisted by climate change researchers to promote knowledge and action on climate change.

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