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The Effect of Climate Change On Livelihoods in Oju Local Government Area of Benue State, Nigeria

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Abstract: *Climate change's detrimental effects on natural and human systems have made it a pressing issue. Despite technological advancements, weather and climate remain crucial in agricultural production. This study assesses the impact of climate change on livelihoods in Oju Local Government Area, Benue State. The research examines climate-influenced livelihood activities, utilizing a systematic multistage sampling technique to select 382 respondents. Structured questionnaires and focus group discussions provided the necessary data, analyzed using Likert-type ratings, mean scores and standard deviation. This study aims to contribute to understanding climate change's effects on local livelihoods, informing strategies for mitigation and adaptation. The findings show that a significant majority (86.9%) agree that the changing climate is affecting human and animal health. Many respondents (79.6%) agree that there have been increased incidences of floods during the rainy season. A significant majority (84.8%) agree that there is a continuous poor yield condition due to high temperature and low rainfall. The respondents' perception suggest that climate change is having significant impacts on: food security, water availability, crop productivity, livestock management, poverty and migration and conflict between herdsmen and villagers. Based on the findings, the study recommended policies and programmes aimed at addressing climate change, such as: climate-resilient agriculture and water management practices, early warning systems for floods and droughts, support for climate-resilient livelihoods and poverty reduction initiatives and conflict resolution and peacebuilding programmes.*

Keywords: adaptation, agriculture, climate change, livelihood, perception

INTRODUCTION

Climate change is one of the most significant challenges facing human society in the 21st century (Intergovernmental Panel on Climate Change, IPCC, 2021). Climate in a narrow sense is usually defined as the “average weather” or the statistical description in terms of the mean and variability of relevant qualities over long period ranging from 30-35 years (Ayoade, 2004). These qualities are most often surface

variables such as temperature, precipitation and wind etc. Climate in a wider sense is the statistical description of the climate system (Jan et al. 2021).

Livelihood is a means or set of activities involving security, water, food, fodder, medicine, shelter, clothing, and the capacity to acquire the above necessities, working either individually or as a group by using endowments (both humans and material) for meeting the requirements of the self and his/her household on a sustainable basis with dignity. The activities are usually carried out repeatedly. For instance, a fisherman's livelihood depends on the availability and accessibility of fish (GreenFact, 2022).

The effects of climate change on livelihood have brought forth severe and possible irreversible alteration to earths geological, ecological and biological systems. It has led to the occurrence of many effects that has been detrimental to livelihood activities e.g. agricultural, fishing, transportation, ecosystem, mining etc. Climate change increased effect on man's health due to the spread of infectious diseases, increased danger of wild fires, loss of biological diversity, people displacement and migration of life as a result of destructions of their homes, desertification, rise in sea-level, conflicts which has compelled them to migrate to an adaptable region. Insecurity caused by harsh weather condition, poor energy supply, ecosystem and biodiversity are also affected by climate change (Izuogu et al., 2021). In 2009, the global humanitarian forum published a report on the global human impact of climate estimating over 30,000 deaths and about $125 billion in economic losses annually (IPCC, 2022). The report also indicates that most climate change induced mortality is due to worsening in floods and droughts particularly in developing countries (GreenFact, 2022).

In the last few decades, cyclic pattern between drought and flooding has become frequent while the severity and pattern distributions have also changed with devastating effects. The phenomenon and direction of trends in water and climate event has become increasingly deviant from normal with warmer and fewer cold days and night, and more frequently hot days and night over most land area (IPCC 2021).

Similarly, heavy rainfall event over many areas have become more frequent and brought more devastating consequence. The effect of this change has manifested in decreased yield in agricultural crops, increase pest outbreak, rampant soil erosion and water logging. Drought affected areas have become unbearable to land degradation, crop damage or increased livestock deaths due to lack of forage and dehydration (IPCC, 2022). This situation will endanger poverty in Nigeria making its livelihood highly unbearable to the effect of projected climate change. It is in the light of the above facts that this study seeks to assess the effects of climate changes on livelihood in Oju Local Government Area (LGA) of Benue State, Nigeria.

Statement of the Research Problem

Climate change is probably the most complex and challenging problems facing the world today (IPCC, 2021). Climate change affects agriculture in several ways, one of which is its direct impact on the yield of crops. It brings additional perspective to the national and state challenge of increasing agricultural production to keep pace with the rising population, while keeping high standards of environmental protection. Negative effects on agricultural yields will be exacerbated by more frequent extreme weather events (Commission of the European Communities [CEC] 2009). According to Iornongo (2021), climate change has altered the climatic characteristics of Benue State which has directly affected crop yield in the state

In Benue State, burning of fossils fuels, firewood burning, and many other activities have exacerbated change in climate. Although, natural influence has also contributed to this change but not the way human activities have contributed (Benue Environmental Protection Agency, BEPA, 2017). Oju urban area is known to have factories that releases toxic substances into the atmosphere. More so, vehicular exhaust, fumes, smokes, along with the use of household generators, releases gases into the atmosphere that exacerbate climate change /global warning. The use of firewood by domestic users and some gases trapped in atmosphere of Oju also contribute to the increase in greenhouse gases (GHGs) that increase the effects of climate (Nigeria Galleria, 2009).

Previous researches: Ademgba et al. (2018); Iornongo (2021); Ariko et al. (2024) and Ikpe et al. (2025) investigated the impacts of climate change on agricultural activities in parts of Nigeria. Their findings were alarming and a wakeup call on stakeholders to address the challenges of climate change on agricultural activities for food security. This research focuses on the effects climate change on livelihoods in Oju LGA area of Benue State, Nigeria. Climate change has affected Oju and its environs and the livelihood activities of the people. The increase in greenhouse gases has led to increase in drought and changes in wet season. During the dry season, the farmers find it difficult to engage in farming activity as a result of limited water and pest outbreaks. Similarly, during the rainy season, farmers experience more flooding that destroys agricultural produces, the health of the people in Oju is not also safe in the sense that GHGs are been released into the atmosphere leading to spreads of diseases that are detrimental to the health of the people in Oju (IPCC, 2007).

Research Questions

The questions this research seeks to answer include: -

i. What is the level of people's awareness of climate change in the study area?
ii. What are the perceived effects of climate change on people's livelihood in the study area?
iii. How do people respond to the effects of climate change in the study area?

Objectives of the Study

Aim of this study is to assess the effects of climate change on the livelihood of Oju and its environs. Specific objectives of the research are to:

i. examine the level of awareness of climate change in the study area.
ii. identify the factors that inform people about climate change in the study area.
iii. determine the various livelihood activities in the study area that are influenced by climate change.
iv. assess the perceived effects of climate change on the livelihood activities in the study area.
v. determine the adaptation responses to climate change in the study area.

Study Area

This study was conducted in Oju LGA of Benue State, Nigeria. Oju LGA was created in 1976, located to the Southern part of Benue State, bounded in the North by her immediate neighbour, Obi LGA; Ebonyi State and Cross River State to the East by Vandeikya, Konshsha and Gwer and to the West by Ado LGA (Hula, 2010). Dry and raining seasons are the two different seasons that occur in the state. The raining season starts from April and end in October while the dry period commences in November and ends in March each year. The state has the temperature ranging between 18ºC to 37ºC and rainfall of 1000-1500mm annually (Morse, 2020).

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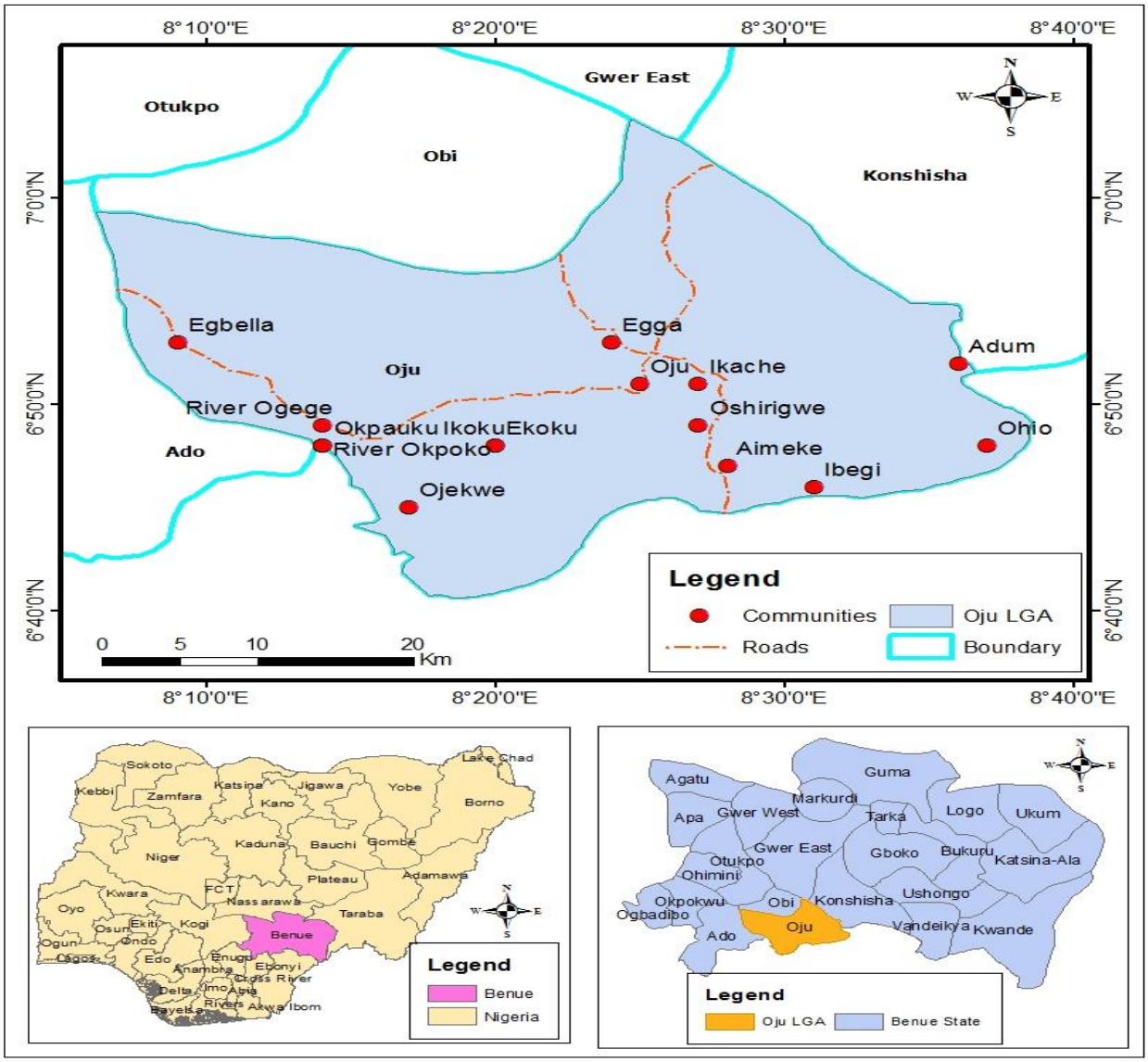

Figure 1: The Study Area
Source: Adapted from the administrative map of Benue State

The main ethnic groups in the LGA are majorly Igede. Benue state has a Guinea savannah kind of vegetation characterized with scattered trees and coarse grasses. The state is one of the highest yams growing LGA in Nigeria (Hula 2010).

METHODS

Structured questionnaire and Focused Group Discussion (FGD) were used to elicit information from the respondents. Four multiple FGDs were designed and conducted in four selected wards of the study area. The data collected for this study was analyzed by means of the Statistical Package for Social Sciences

(SPSS) software such as weighted mean, standard deviation and percentages. The analysed data were presented using tables and charts.

Presentation and discussion of results

The demographic characteristics of the respondents in the selected wards were identified, analyzed and presented in Table 1. The results show that 199 (52.1%) were male, while 183 (47.9%) were female. The gender distribution is relatively balanced, with a slight majority of males. This suggests that the population is fairly representative of both genders. On the age distribution of the respondents, 129 (33.8%) were 30-40 Years; 122 (31.9%) were 41-50 Years; 104 (27.2%) fell between the ages of 51-60 Year; 21 (5.5%) were within the ages of 61-70 Years, while a 6 (1.6%) were 71 Years and Above. The majority of the population (65.7%) falls within the 30–50-year age range, indicating a relatively mature population. This could imply a stable workforce and community.

On the religious belief of the respondents, 35 (9.2%) were Muslims; Christianity: 306 (80.1%); Traditional Religion: 35 (9.2%) and 6 (1.6%) practiced other forms of religion. Christianity is the dominant religion, making up 80.1% of the population. This could have implications for community values and cultural practices.

Table 4.1: Socio-Demographic Characteristics of Respondents

	Response	Frequency	Percentage	Cumulative Percent
Gender	Male	199	52.1	52.1
	Female	183	47.9	100
TOTAL		**382**	**100**	
Age	30-40 Years	129	33.8	33.8
	41-50 Years	122	31.9	65.7
	51-60 Years	104	27.2	92.9
	61-70 Years	21	5.5	98.4
	71 Years to Above	6	1.6	100
		382	**100**	
Religion	Islam	35	9.2	9.2
	Christianity	306	80.1	89.3
	Traditional religion	35	9.2	98.4
	Others	6	1.6	100
		382	**100**	
Educational qualification	Primary	36	9.4	9.4
	Secondary	104	27.2	36.6
	Tertiary	197	51.6	88.2
	Koranic	2	.5	88.7
	None	43	11.3	100
		382	**100**	
Marital Status	Married	194	50.8	50.8
	Divorced	45	11.8	62.6
	Single	131	34.3	96.9
	Widowed	12	3.1	100
		382	**100**	

Occupation	Farmer	159	41.6	43.2
	Business	68	17.8	61.0
	Civil servant	96	25.1	86.1
	Artisan/handwork	30	7.9	94.0
	Others	23	6.0	100
	No response	23	6.0	100
		382	**100**	
Livelihood (Business/farming activities)	Yes	313	81.9	81.9
	No	69	18.1	100
		382	**100**	
Been living in the Settlement	20-30 year	213	55.8	64.4
	31-41 years	68	17.8	82.2
	41 and above year	68	17.8	100
	No response	33	8.6	8.6
TOTAL		**382**	**100**	

Source: Field work, 2025

On the educational qualifications of the respondents, 36 (9.4%) had primary education; Secondary: 104 (27.2%); Tertiary: 197 (51.6%); Koranic: 2 (0.5%) while 11.3% had no educational qualifications. Over half of the population (51.6%) has tertiary education, indicating a relatively educated population. This could imply a skilled workforce and informed community.

On the marital status of the respondents, 194 (50.8%) were married; 45 (11.8%) were divorced; 131 (34.3%) were single and 12 (3.1%) were widowed. Half of the population is married, while 34.3% are single. This could have implications for family structures and social support networks. The occupation of the respondents was summarized as follows: farmer 159 (41.6%); Business: 68 (17.8%); Civil Servant: 96 (25.1%); Artisan/Handwork: 30 (7.9%) and Others: 23 (6.0%). Many respondents have been engaged in their occupation for 20-40 years, suggesting a high level of experience and expertise. Farming and civil service are the most common occupations, indicating a mix of agricultural and formal sector employment. A significant majority (81.9%) engage in business or farming activities, suggesting a strong entrepreneurial spirit and reliance on these sectors for livelihood. On the duration of the respondent's residence in the area, 213 (55.8%) had lived in the area for 20-30 years; 68 (17.8%) for 31-41 years; 68 (17.8%) for 41 years and above. Over half of the population (55.8%) has lived in the settlement for 20-30 years, indicating a relatively stable community.

These analyses provide insights into the demographic characteristics, occupation, and livelihood of the population. They can inform policies, programmes, and interventions tailored to the specific needs and context of this community.

Respondents' perception of climate change issues

The awareness/perception of respondents in relation to climate change are presented in Table 2.

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Table 2: Awareness of Climate Change

	Response	Frequency	Percentage
Awareness of climate change	Yes	312	81.7
	No	70	18.3
Total		**382**	**100**
Notice changes in climate	Less than 5 years	57	14.9
	6-10 years now	65	17.0
	11-15 years	102	26.7
	16-20 years	61	16.0
	21 years and above	80	209
Total		**382**	**100**

Source: Field work, 2025

Majority of the respondents (81.7%) stated that they are aware of climate change while only 70 (18.3%) stated that they are not aware of climate change. A significant majority (81.7%) of respondents are aware of climate change, indicating a high level of awareness. This result agrees with Ikpe 2021 which stated over 70% of grain farmers in Sokoto State are aware of climate change. On the duration of the awareness and the noticed changes in climate change issues in the area, 57 (14.9%) have noticed changes in climate change in less than 5 years; 65 (17.0%) 6-10 years; 102 (26.7%) 11-15 years; 61 (16.0%) 16-20 years; 80 (20.9%) 21 years and above. Many respondents (26.7%) have noticed changes in climate over the past 11-15 years, suggesting a growing awareness of climate change. This result disagrees with Ejeh 2014 which reported that radio was the major source of information on climate change among farmers in Kano State.

Source of information on climate change

On the sources of information on climate change, personal observation is the primary source of information on climate change, followed by interactions with others. This suggests that respondents are actively observing and experiencing the impacts of climate change in the area.

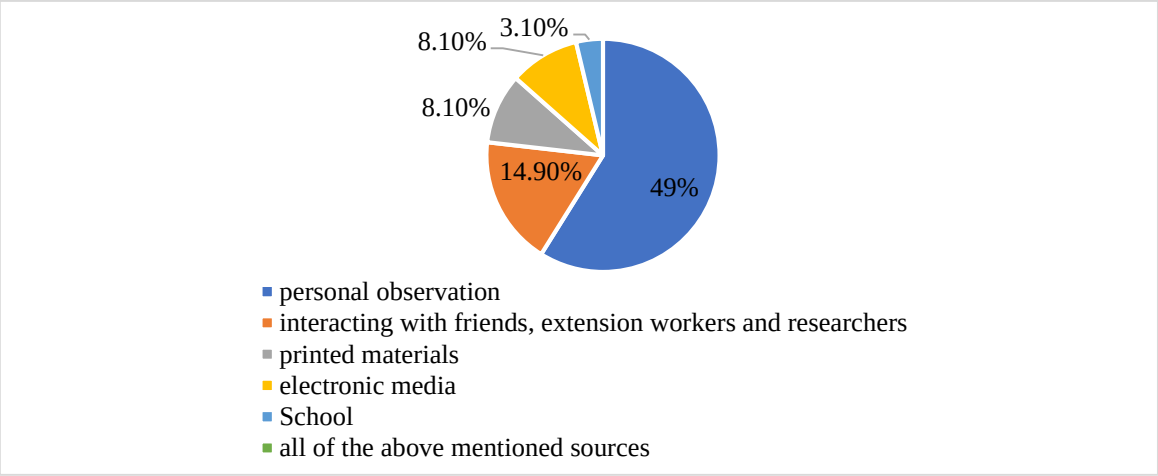

Figure 2: Sources of information on climate change issues

The high level of awareness and personal observation of climate change suggests that respondents are likely to be receptive to climate change mitigation and adaptation strategies. This awareness can be leveraged to promote sustainable practices and climate-resilient livelihoods. These findings can inform policies and programmes aimed at addressing climate change, such as: climate change education and awareness programmes, climate-resilient agriculture and livelihood initiatives and community-based adaptation and mitigation strategies. By understanding the socio-demographic characteristics and awareness of climate change among respondents, stakeholders can design more effective and targeted interventions.

Effects of climate change on means of livelihood

The effects of climate change in the locality in the area is presented in Table 3.

Table 3: Effects of climate change on livelihood in the area

S/N	Variables	SA	A	U	SD	D	Mean	STD
A	Insufficient/shortage of food supply in recent years	195 (51.0)	145 (38.0)	16 (4.2)	18 (4.7)	8 (2.1)	4.31	0.913
B	Agricultural drought and insufficient water for irrigation and domestic uses in recent years	173 (45.3)	181 (47.4)	13 (3.4)	13 (3.4)	2 (0.5)	4.34	0.748
C	Increase in crop infestation by pests and diseases	164 (42.9)	139 (36.4)	65 (17.0)	10 (2.6)	4 (1.0)	4.18	0.877
D	Shift in crop(s) cultivated	113 (29.6)	194 (50.8)	56 (14.7)	10 (2.6)	9 (2.4)	4.03	0.872
E	Flooding of farmlands and residential areas	187 (49.0)	118 (30.9)	44 (11.5)	20 (5.2)	13 (3.4)	4.17	1.047
F	Migrating sand dunes burying arable lands	155 (40.6)	135 (35.3)	66 (17.3)	19 (5.0)	7 (1.8)	4.08	0.969
G	Increase in poverty, migration and clashes with herdsmen and villagers	194 (50.8)	117 (30.6)	41 (10.7)	20 (5.2)	10 (2.6)	4.22	1.008

Source: Field Work, 2025

*Average mean: 3.0

- **SA** – Strongly Agreed; **A** – Agreed; **U** – Undecided; **SD** – Strongly Disagreed; **D** – Disagreed

The results on the effect of climate change on the livelihood of the respondents show that a significant majority (89%; Mean: 4.31; STD: 0.913) agree that there is an insufficient/shortage of food supply in recent years. This result agrees with Ikpe 2021 which reported shortages of food supply in recent times as an effect of climate change in Sokoto State.

The majority of respondents (92.7%; Mean: 4.34; STD: 0.748) agree that there is agricultural drought and

insufficient water for irrigation and domestic uses. Agricultural drought was reported in Kaduna State by Ariko et al. 2024 as an impact of climate change on agricultural activities.

Many respondents (79.3%; Mean: 4.18; STD: 0.877) agree that there is an increase in crop infestation by pests and diseases. This result corroborated with the findings of Isaac and Ikpe 2024 which reported an increase in crop infestation by pest and diseases as a result of climate change.

As additional effect of climate change on livelihood, a significant proportion of respondents (80.4%; Mean: 4.03; STD: 0.872) agree that there is a shift in crop(s) cultivated.

Many respondents (79.9%; Mean: 4.17; STD: 1.047) agree that there is flooding of farmlands and residential areas. Vincent et al. (2014) reported that the farmlands of Oleh community (South-south of Nigeria) have been subjected to seasonal flood events during and after every rain throughout the period of 2011 and 2012. The study further revealed that all the food crops cultivated by the inhabitants of Odah, Iwhreotah and Erorin quarters are affected by flooding. The results of the analysed data showed satisfactory impact of flooding on crop yield in the area stated that heavy rainfall has led to severe erosion which has affected farmlands. They further reported that flooding has also led to the submergence of crops, farmlands, livestock and death of some people thereby causing crop failure, poor yield, and shortage of food as well as poverty.

A significant proportion of respondents (75.9%; Mean: 4.08; STD: 0.969) agree that migrating sand dunes are burying arable lands. The result that migrating sand dunes are burying arable lands in the study area agrees with the study of Odjugo and Ikhuoria (2003), which reported that 12ºN of Nigeria is characterized by migrating sand dunes burying arable lands. The result further concurs with the findings of Odjugo (2010) which observed that the migrating sand dunes have buried large expanse of arable lands, thus reducing viable agricultural lands and crops' production.

Increase in poverty, migration and clashes between herdsmen and villagers, many respondents (81.4%) agree that there is an increase in poverty, migration, and clashes between herdsmen and villagers were reported as an effects of climate change on livelihood in the area. This information was supported by

A significant majority (79.8%; Mean: 4.10; STD: 1.138) agree that there is a decrease in grain yield.

Implications

The respondents' opinions suggest that climate change is having significant impacts on:

a. Food security
b. Water availability
c. Crop productivity
d. Livestock management
e. Poverty and migration
f. Conflict between herdsmen and villagers

These findings can inform policies and programmes aimed at addressing climate change, such as:

a. Climate-resilient agriculture and water management practices
b. Early warning systems for floods and droughts

c. Support for climate-resilient livelihoods and poverty reduction initiatives
d. Conflict resolution and peacebuilding programmes

By understanding the impacts of climate change in the locality, stakeholders can design more effective and targeted interventions.

CONCLUSION

This study examined the effects of climate change on livelihood in Oju LGA of Benue State. The findings show that 81% of the respondents are aware of climate change issues in the area indicating a high level of awareness. A significant majority (86.9%) agree that the changing climate is affecting human and animal health. 79.6% of the respondents agree that there have been increased incidences of floods during the rainy season. A significant majority (84.8%) agree that there is a continuous poor yield condition due to high temperature and low rainfall and that climate change is having significant impacts on: food security, water availability, crop productivity, livestock management, poverty and migration and conflict between herdsmen and villagers.

Recommendation

Based on the findings of the study, this study recommended that informed policies and programmes aimed at addressing climate change be implemented, such as:

a. Climate-resilient agriculture and water management practices
b. Early warning systems for floods and droughts
c. Support for climate-resilient livelihoods and poverty reduction initiatives
d. Conflict resolution and peacebuilding programmes

By understanding the impacts of climate change in the locality, stakeholders can design more half

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