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Farmers Responses to Climate Change Consequences in Isoko Local Government Area of Delta State, Nigeria

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ABSTRACT

Adaptation to climate change is pivotal to increased food production especially in weather sensitive rural communities in Nigeria. This study analyzed farmers' responses to climate change consequences in Isoko South Local Government Area of Delta State, Nigeria. Multi-stage sampling technique was used to select 64 respondents. Data for the study were obtained with the aid of structured questionnaire and analyzed using descriptive statistics. Results showed that majority of the respondents had formal education, while 23 years were their average farming experience, with (62.5%) having 4-6 persons as their major household size. The mean awareness level was 2.5. This implies that most of the respondents are aware that climate has actually changed. Although multiple responses were recorded only 31.1% affirmed that excess flooding were their major environmental problems. The strategy employed as risk averse was planting of disease resistant varieties. The respondents accentuated that they received more stimulus, interactions and adaptive packages from government institutions than Non-governmental institutions. The major constraint encountered to practice adaptation to climate change was lack of funds. It was recommended that both government and Non-governmental institutions should assist rural farmers in adapting to climate change in their study area.

Keywords: *Responses, Climate change, Consequences, Delta State, Farmers, Nigeria.*

INTRODUCTION

Climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity (Nnaji, 2012). It refers to a change in climate which is attributed directly or indirectly to human activities, that alters the composition of the global atmosphere and which is in addition to natural variability observed over comparable time periods (Intergovernmental Panel on Climate Change (IPCC, 2007). Climate change presents challenges to the resilience of the agricultural system and food security (IPCC, 2010). It has negatively affected the agricultural sector through temperature increase, variability in precipitation, floods, droughts, and other extremes (IPCC, 2010). Today, about 12% of the worlds' populations live in hunger (IPCC, 2010). Approximately 75%

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of the chronically hungry people reside in rural areas of developing countries where most of their livelihoods depend directly or indirectly on agriculture (IPCC, 2012). The Food and Agriculture Organization (FAO) estimates that, agricultural production will have to increase by about 60% by 2050 to meet the expected demand for food (FAO, 2009). At the same time, a growing body of studies concludes that many regions in the world are likely to face increased climate variability and change thereby adversely affecting agricultural production (IPCC, 2012). Therefore, climate variability and changes are presently a threat to agricultural production as they pose potential adverse consequences to natural resources, including the management of water and land, ecosystem and human health (IPCC, 2007).

Africa contributes the least to global emissions of greenhouse gases; yet, most African countries are most vulnerable to its effects particularly due to its high dependence on rain fed agriculture, widespread poverty, inadequate access to technology and improved cultural practices (Aloa, 2010). It is observed that economies of African countries depend largely on agriculture and tourism. These sectors are particularly vulnerable to environmental challenges; among which climate change emerge as the most devastating to sustainable development in Africa (Aloa, 2010). According to IPCC (2007); Kurukulasuriya and Mendelsohn (2006), the evident fallout of climate change can be reduced through adaptation, although, African farmers have a low capacity to adapt to changes owing to low technological development, poverty and illiteracy (Enete and Achike, 2008).

Supporting the adaptation strategies of local farmers by both government and Non-governmental institutions through appropriate public policy, investment and collective actions can help increase the adaptation measures that will reduce the negative consequences of predicted changes in future climate with great benefits to vulnerable rural communities in Nigeria and Africa sub region (Hassan and Nhemachena, 2008). Therefore, this study will assert the position of rural farmers and their adaptation strategies to climate change in Isoko Local Government Area of Delta state, Nigeria. It will also address the following research questions: what are the socio-economic characteristics of the farmers in the study area? What is their awareness level of climate change in the study area? What are the environmental consequences experienced by the respondents in the study area? What are the strategies employed by the respondents as risk averse mechanism in the study area? What are the number of stimulus, interactions and adaptive packages given to respondents by both government and non-governmental institutions in the study area? What are the lacks of interventions constraints faced by the respondents in their study area?

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MATERIALS AND METHOD

The study was conducted in Isoko South Local Government Area of Delta State, Nigeria. The area is one of the two local governments that make up the Isoko region. The population of the study comprises all farmers in Isoko South Local Government Area, Delta State. The Isoko South Local Government Area covers an area of 704km², it is in the tropical rain forest area of the Niger Delta. The region experiences high rainfall and high humidity most of the year *(http://www.citypopulation.de/php/nigeria-admin.php?adm2id=1010)*. The climate is equatorial and is marked by two distinct seasons, the dry and rainy seasons *(http://nigeria-local-government.blogspot.com/2010/04/hon-ogieh-and-isoko-south-lg.html)*. The Dry season lasts from about November to April and is significantly marked by the cool "harmarttan" dusty haze from the north-east winds. The rainy season spans May to October with a brief dry spell in August (Jones and Otite, 1975) The main economic activity is food crops farming . And the stable food crops include cassava and yams also a wide spread of palm oil and palm kernels (Michael, 2020). Limited amount of hunting and fishing is also done. Cassava is a source of most of the foods consumed by the Isoko people.

Sampling and sample size

Multi-stage sampling technique was used to select 64 respondents. Data for the study were obtained with the aid of structured questionnaire and analyzed using descriptive statistics such as cross tabulation. In the Cross tabulation table below, variables such as X11and X23 are used to denote the number of cases in a given cell. The row was for each category of one variable and a column for each category of the other variable .It makes no difference which of the two variables government and non-government institutions were used for the rows and which for the columns. One kind was the cell entry scores which store the number of cases in any box in a table. It is important to know that a cell entry score was the number of cases with a specific value for each variable such as (number of stimulus, interactions and adaptive packages given to farmers).

Government institutions	Non-Governmental institutions	Others
X11	X12	X13
X21	X22	X23
X31	X32	X33
X41	X42	X43

Cross tabulation was used to assert the relationship between the government and non-governmental institutions on the number of stimulus, interactions and adaptive strategies given to farmers in the study area.

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RESULTS AND DISCUSSION

Table 1: Distributions of respondents according to their socio-economic characteristics

Variables	Frequency	Mean	Percentage
Gender			
Male	48		75.0
Female	16		25.0
Age			
15-24	2		3.1
25-54	43		67.2
55-64	10		15.6
65 and above	9		14.1
Marital Status			
Single	4		6.3
Married	40		62.5
Divorced	8		12.5
Widowed	12		18.8
Level of Education			
No formal education	4		6.3
Primary	32		50.0
Secondary	23		35.9
Tertiary	5		7.8
Years of farming Experience			
1-10	5		7.8
11-20	15		23.4
21-30	34	23years	53.1
31-40	10		15.6
Household Size			
1-3	13		20.3
4-6	40		62.5
7-10	10.9		
11-13	3		4.7
Above 14	1		1.6
Yearly Income Status (N)			
Less than 100,000	18		28.1
200,000-400,000	38		59.4
500,000-700,000	6		9.4
Above1000, 000	2		3.1
Other Sources of Income			
Trading	21		32.7
Hunting	12		18.8
Fishing	27		42.2
Artisan	3		4.7
Others	1		1.6
Total	**64**		**100**

Source: Field Survey Data, 2020.

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Table 1 shows the distribution of respondents according to their socioeconomic characteristics. It revealed that, majority (75.0%) of the farmers were males, while 25.0% were females. This indicates that more males were involved in farming than females in the study area. The mean age of the respondents was 46 years. This implies that they will be energetic and innovative to practice adaptation programmes. Only 62.5% of the farmers were married, while 50.0% had primary education, and 35.9% had secondary education, meaning that they can read and write. The mean years of farming experience was 23 years, showing that they must had long years' in farming and interactions with government and non-governmental institutions on issues relating to climate change.

Table 2: Distribution of respondents according to their awareness level of climate change consequences using Likert in the study area

Awareness level	**Frequency**	**Percentage**	**Mean**
Very Low Level	12	18.8	
Low Level	18	28.1	
High Level	24	37.5	
Very High Level	10	15.6	2.5
Total	**64**	**100**	

Source: Field Survey Data, 2020.

Table 2 indicates the awareness level of climate change consequences by the respondents. It shows that only 37.5% had, high level awareness, while 18.8% had very low level awareness. But, the mean awareness level of 2.5 implies that most of the respondents are aware of climate change consequences in the study area. Similar results were obtained by Chukwuji et al, (2019).

Table 3: Distribution of respondents according to environmental consequences experienced in their study area

Environmental consequences experienced	**Frequency**	**Percentage**
Excess Flooding	64	31.1
Gulley erosion	43	20.9
Excess rainfall	48	23.3
Excess weeds and disease infestation	23	11.2
Climate variability/Seasonal variations)	16	7.7
High humidity	12	5.8
Total	**206**	**100**

Source: Field Survey, 2020.Multiple responses recorded.

Table 3 accentuates the environmental consequences experienced by the

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respondents as a result of climate change in the study area. From table3 above only 31.1% attest that excess flooding were their major environmental devastation experienced. This finding corresponds with Gurung and Bhandari (2008) who also discovered that the people in Chituen village in Nepal experienced floods and erratic pattern of rainfall, but in Nigeria, due to lack of vulnerability assessment and of preparedness of emergency response does not facilitate actions for evacuation of people, and the results are inevitably devastating (Amangabara and Obenade, 2015).

Table 4: Distribution of respondents according to strategies employed as risk averse mechanisms in the study area

Strategies Employed	**Frequency**	**Percentage**
Diversification	45	14.5
Re-settlement(IDP CAMPS)	32	10.3
Good adaptation & mitigation measures	58	18.6
Good cultural practices	46	14.8
Planting disease resistant varieties	59	19.0
Application of organic manuring	48	15.4
Others	23	7.4
Total	**311**	**100**

Source: Field Survey, 2019. Multiple responses recorded.

The Strategies Employed by the Respondents as Risk Averse Mechanisms in the Study Area

The result in table 4 shows the adaptation strategies practiced to cushion the effect of climate change in the study area. The adaptation strategies mostly practiced by the farmers include planting disease resistant varieties .This findings are in consonance with the findings of Osuji et al (2019),who classified, adaptation techniques of the farmers to mostly; use of disease and pest resistant varieties and others. It is on this premix, that adaptation to adverse effects of climate change is a key issue for all countries; especially developing countries who are often the most vulnerable and least equipped to adapt. Adaptation is widely reorganized as a vital component of any policy response to climate change because it helps farmers achieve their food, income and livelihood security objectives in the face of changing climatic and socio-economic conditions such as drought and flood, and volatile short term changes in local and large-scale markets (Kandlikar and Risbey, 2000).

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Table 5: The number of interactions and stimulus packages received from both government and non-governmental institutions in the study area.

Number of interactions and stimulus packages received	Government Institutions		Non-Governmental Institutions		
	Frequency	**Percentage**	**Frequency**	**Percentage**	**Total**
Fertilizer	34	33.3	18	17.6	52(50.9)
Working	20	19.6	12	11.8	32(31.4)
Equipment	10	9.8	8	7.8	18(17.6)
Total	**64**	**62.7**	**38**	**37.2**	**102(100)**

Source: Field Survey, 2020.

Table 5 asserts that respondents received more stimulus packages (cash gift, knap sack sprayers, motor cycle and others) and more interactions from governmental institutions than Non -governmental organizations. This finding is in consonants with Nweke, Spencer and Iynam (2002) who reported that the combine efforts of National Root Crops Research Institute (NRCRI) and International Institute of Tropical Agricultural (IITA) resulted to the release of 22 improved cassava varieties to Nigerian farmers; In the same vein, Aghoghovbia (2019), reiterated that, through the interaction between the farmers and experts who served as resource persons at the workshop, organized by The African Reinsurance Corporation and the International Finance Corporation (IFC), were optimistic that lessons learnt, from the workshop, would within the next two years, address the challenges facing the Nigerian insurance industry in the implementation of agriculture index insurance contracts. Also, the farmers at the end of the Workshop met, one-on-one, on the problems, especially weather related problems affecting their operations.

Table 6: Distribution of respondents according to constraints encountered in the study area

Constraints encountered	Frequency	Percentage
Lack of funds	64	17.5
Embezzlements	39	10.7
Lack of extension agents	53	14.5
Bad government policies	48	13.1
Lack of infrastructural facilities	58	15.9
Lack of institutional access	37	10.1
Lack of capacity building	43	11.8
Others	23	6.3
Total	**365**	**100**

Source: Field Survey, 2019.Multiple responses recorded.

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Table 6, shows the constraints encountered by the respondents .From the table above shows that majority (64%) reiterated that, lack of funds were their major constraints. This finding is in consonance with findings of (Enete and Achike, 2008), that African farmers have low capacity to adapt to changes owing to low technological development, poverty and illiteracy. Only 6.3% clearly stated that political party differences, ethnicity and religious bias were their major problems. It is therefore recommended that urgent attention should be given by government agencies to solve these constraints so that the effect of climate change on agricultural production faced by the respondents in the study area can be ameliorated.

CONCLUSION AND RECOMMENDATIONS

Farmers in the study area are in their active age and can adopt innovations geared towards solving the problems of climate change. Funds should be made available to them by the government. Government should also create a conducive, synergy with international NGOs in order to eradicate consequences of climate change in the study area.

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