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Perception, Adaptation Strategies and Challenges of Climate Change among Rural Households in Anyigba, Dekina Local Government Area of Kogi State, Nigeria

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Abstract

Climate change is one of the most serious challenges confronting agriculture, particularly, rural households in Nigeria. It is against this backdrop that this study examined the perception, adaptation strategies and challenges of climate change among rural households in Anyigba, Kogi State, Nigeria. A two stage sampling techniques was used in the study. The first stage involves the purposive selection of six (6) rural farming communities, followed by a random selection of twenty (20) farmers each from the communities making a total of 120 respondents, the data were elicited with the aid of a structured questionnaire. The data were analyzed using descriptive statistics such as frequency counts, percentages, mean distribution and ranking. Most farmers observed change in climate, on their perception of climate change, the result showed that majority (44.9%) perceived climate change not to be severe, 41.5% perceived climate change to be very severe while 13.6% were undecided. On the perceived effects, most (87.5%) agreed to prevalence of pest and diseases, followed by high temperature (85.5%) as the major consequence of climate change in the area. Pesticide application (81.7%) was the major adaptive strategy used in the study area. Mulching (66.7%) is also very common in the area. Lack of government support (88.3%), inadequate extension services (86.7%), lack of finance (83.3%) among others were the main constraints to adaptation adoption in the study area. The study concluded that the respondents were aware and knowledgeable on the issues of climate change. The study concludes that there is need for government to make concrete efforts to enact appropriate policies on climate change adaptation.

1. Introduction

Agriculture is referred to as the major economic activity providing food and fibre necessary for the sustenance of human life. Globally 80% of the agricultural land area is rainfed which generates 65 to 70% staple foods but 70% of the population inhabiting these areas are poor due to their low level of productivity (Ashalatha, Munisamy, and Bhat, 2012). Agriculture remains the mainstay of most African economies and is a major contributor to the Gross Domestic Product of the region. It accounts for a third of African`s GDP, employs in many of the country about 60-90% of the total labour force and is the main source of livelihood for poor people (Oyiga, Mekbib and Christine, 2011). Large number of

African`s poor live in rural areas, where they depend directly or indirectly on agriculture for living. In Sub-Saharan Africa (SSA), about 60% of economically active population works in the agricultural sector (Oyigaet al., 2011). In West African sub-region, agriculture is critical to the economy. The sector's contribution is about 30% in West Africa. In addition, over 65% of the population in the region is rural, and about 90% of the rural population directly depends on rain-fed agriculture for income and food security (Agwuet al., 2013). Agriculture remains the leading sector of the Nigerian economy; this is in terms of its contribution to the country's real GDP. In Nigeria, Agriculture contributed 41.25% of GDP in 2005

almost the same as in 2004 (Central Bank of Nigeria, 2005).

The performance of the agricultural sector is greatly influenced by crop production, which depends on a large number of factors e.g. climate, soil and socio-economic factors among others. Also, crop production is impacted by a number of other factors namely meteorological factors, including increasing temperatures, fluctuating precipitation regimes, and rising atmospheric carbon dioxide levels. Climate change refers to any change in climate overtime, whether due to natural variability or as a result of human activity (IPCC, 2001). While climate change is a global phenomenon, its negative impacts are more severely felt by poor people in developing countries who rely heavily on the natural resource base for their livelihoods (Bidoliet al, 2012). Majority of these poor resources farmers live in rural areas. Climate change is perhaps the most serious environmental threat to the fight against hunger, malnutrition, diseases and poverty in Africa, mainly as a result of its impact on agricultural productivity. The negative effect on agricultural yields will be exacerbated by more frequent extreme weather event (Fawoleet al, 2012). Climate change leads to an increase in the frequency, intensity and duration of floods and droughts and also heat waves (Kuta, 2011). Building Nigeria's Response to Climate Change (Nwaliejiet al, 2012) observed that climate change or global warming has become a new reality, with deleterious effects: seasonal cycles are disrupted, as are ecosystems; agriculture, water needs and supply, and food production are all adversely affected. Climate change also leads to sea-level rise with its attendant consequences, and includes fierce weather, increased frequency and intensity of storms, floods, hurricanes, droughts, increased frequency of fires, poverty, malnutrition and series of health and socio-economic consequence (Nwalieji et al, 2012).Agriculture is mostly affected by climate change because of its dependence mainly on environmental conditions. According to International Fund for Agricultural Development, (IFAD, 2008) about 95% of Agriculture in Africa directly depends on rainfall which makes African agriculture particularly vulnerable to climate change. Rural poor communities rely greatly for their survival on agriculture and livestock husbandry that are amongst the most climate-sensitive economic sectors. Climate change will have far-reaching consequences on animal husbandry mainly via impacts on grass and range productivity (Bidoliet al, 2012).

Early efforts to deal with the challenges of climate change focused mainly on mitigation, with the aim of reducing and possibly stabilizing the greenhouse gases concentration in the atmosphere (Odjugo, 2010). Adaptation however is concerned with feasible option in reducing vulnerability and associated negative climate change effect (Jones, 2010). It seeks to avoid harm or exploit beneficial opportunities. If adaptation is taken into account, there is great potential to increase food production under climate change in many regions of the world (Rosenzweig and Parry, 1994, cited by Okpe and Aye, 2015). Climate change will have greater negative impacts on poorer farm households as they have the lowest capacity to adapt to changes in climatic conditions. Adaptations measures are therefore important to help these communities to better face extreme weather conditions and associated climatic variations. Hence, the potential damages of climate change can be reduced by adaptation. Based on this background, the study assessed the perception, adaptation strategies and challenges of climate change among rural farm households in Anyigba, Kogi State, Nigeria. The specific objectives are to:

1) ascertain the perception of the respondents about climate change;
2) identify the observable changes as a result of climate change in the area;
3) examine the adaptation strategies of climate change in the study area; and
4) identify the constraints to use of climate change adaptation strategies in the study area.

2. Materials and methods
2.1 Study Area
The Study Areas is Anyigba in Eastern Part of Kogi State in Dekina Local Government Area. Anyigba lies between longitude 7º 21'' East of the Greenwich Meridian and latitude 7º 36'' North of the Equator. The climate region is characterized partly by double and single maximum rainfall pattern with about four months of dry season. In the mornings, Relative Humidity generally rises to over 80% and falls between 50%-70% in the Afternoon during the wet season. Rainy season occur between April through October and the peak is September. Rainfall in Anyigba is seasonal which means, it is not all the yearround. Extreme variations in total Rainfall for July and August are also general characteristics of rainfall here. Heavy rains of conventional type falls here and this sometimes amount up to about 978.5mm, but may be more. The mean rain days for this area are approximately 73.90days.

2.2 Type of Data and Sampling Technique
Primary data was used for this study. The data was collected using a structured questionnaire. A two-stage sampling method was used for this study. First, a purposive selection of six communities based

on rural features and their active participation in farming. The communities selected were; Iji, Agala-Ogane, Agala-Ate, Atanegoma, Zamfara and Eti-Ukpolo. Secondly, 20 households were randomly selected from each of the communities, giving a total sample size of 120 households to whom copies of questionnaire were administered.

3. Results and discussion

3.1 Socio-economic Characteristics of Respondents

Table 1 shows that majority of the respondents (73.3%) were male while the remaining 26.7% were female. This suggests that males are more actively involved in farming in the study area. The dominance of male farmers in the survey may be associated with the tedious nature of farming in the study area this tally with the findings of Opaluwaet al., (2018) who reported male dominance among farming households in Akure North Local Government Area of Ondo State, Nigeria. The result also reveals that majority of the respondents (60%) were between the ages of 21-40 years while only 9.2% of the respondents were above 60 years. The mean age of the respondent was 40.3 years. This suggests that most of the farmers were still in their active and productive ages and may be vibrant and efficient in climate change adaptation.

Furthermore, result showed that 50.8% of the respondents had been educated up to secondary level and a small proportion (8.3%) had no formal education at all, while 17.5% and 23.3% had tertiary and primary education respectively. This percentage implies that literate farmers dominate the study area. According to Okpe and Aye (2015), farmers who have some level of education would be able to understand the intricacies of farming and climate change well. This will also transcend into higher adaptive capacity. The result shows that majority (73.3%) of the respondents was married, 23.3% were single, 2.5% were widowed and 0.8% divorced. This is consistent with Opaluwaet al (2014) who found out that majority of maize farmers in Kogi State, Nigeria were married. According to Ozoret al. (2015) marriage could provide farmers with a supply of family labour and it also enhances the share of information. This can also help promote climate change adaptation among farming households.

Results also showed that majority (46.7%) of the respondents had household sizes of between 6-10 persons. Others were 16.7%, 24.2% and 12.8% having household sizes of between 1-5, 11-15, 16 and above respectively. The average number of persons in a household is 7. Higher household size suggests the availability of family labour. This corresponds with Mammanet al. (2014). Result also revealed that most

farmers (56.6%) had farming experience above 10 years. The average farming experience of the respondents is 14 years. Farmers with higher farming experience will adapt easily to changes in climate change. The result shows that 83 (69.2%) of the respondent had no access to extension service. Nhemachena (2009) revealed that extension service could have positive impact on adaptation to climate change. Based on the result, majority (41.7%) of the respondents had annual income between N10,000-100,000 while 19.2 % had annual income of N501,000 and above. This implies that majority are low income earners. Higher income indicates a better chance to adopt new technologies in adapting to climate change.

3.2 Perception of Respondents on Climate Change

The result (Table 2) revealed that 41.5% of the respondents perceived climate change to be severe, 44.9% perceived it to be not severe while 13.6% were undecided. Hence it can be deduced that climate change as perceived by the respondents in the study is not severe. This is in contrast with Maharjanet al. (2011) which revealed that climate risk and hazard have severe impact in the study area.

3.3 Observable Effects of Climate Change

The result showed (Table 3) the observable effects of climate change by the farmers in the study area. Prevalence of pest and diseases (87.5%), High temperature (85.5%),declining crop yield (85.8%),Unpredictable rainfall (82.5%),declining soil fertility (68.3%),High rate of weed growth (65%) were the observable effects of climate change in the study area. The result was in line with the result of Nhemachena and Hassan (2009) who reported the frequent occurrence of some unfavourable environmental parameters. These will negatively impact crop and livestock production in the study area.

3.4 Adaptation Strategies for climate change

The result showed (Table 4) the distribution of the various adaptation strategies used by the farmers. The result revealed that the adaptation measures to the effects of climate change among the respondents include; increased pesticide application (81.7%), use of mulching (66.7%), increased use of pest fertilizer (65.0%), increased weeding (53.3%), and changing the timing of land preparation (50.8%). Only 4.2% of the farmers said they did nothing.

Table 1. Socio-economic Characteristics of households in the study area

Socio-economic Characteristics	Frequency	Percentage	Mean
Gender			
Male	88	73.3	40.3 years
Female	32	26.7	
Total	120	100	
Educational Status			
No formal education	10	8.3	
Primary	28	23.3	
Secondary	61	50.8	
Tertiary	21	17.5	
Total	120	100.0	
Marital Status			
Single	28	23.3	
Married	88	73.3	
Widowed	3	2.5	
Divorced	1	.8	
Total	120	100.0	
Household Size (Persons)			
1-5	20	16.7	
6-10	56	46.7	
11-15	29	24.2	7
16 above	15	12.5	
Total	120	100.0	
Farming Experience (Years)			
1-10	52	43.3	
11-20	34	28.3	14
21 above	34	28.3	
Total	120	100.0	
Access to Extension service			
Yes	37	30.8	
No	83	69.2	
Total	120	100.0	
Annual income (Naira)			
10,000-100,000	50	41.7	
101,000-500,000	47	39.2	
501,000 above	23	19.2	
Total	120	100.0	

Source: Field Survey Data, 2018

Table 2. Perception of the Respondents on Climate Change

Perception	Frequency	Percentage	Ranking
Severe	49	41.5	2nd
Undecided	16	13.6	3rd
Not Severe	53	44.9	1st
Total	120	100	

Source: Field survey, 2018

Table 3. Distribution of Respondents Observable Effects of Climate Change

Observable Effects of Climate Change	Frequency	Percentage	Ranking
Unpredictable rainfall	99	82.5	4th
High Temperature	103	85.8	2nd
Declining soil fertility	82	68.3	5th
Incidence of flooding	41	34.2	7th
High rate of weed growth	78	65.0	6th
Prevalence of pest and disease	105	87.5	1st
Declining crop yield	103	85.8	2nd

Source: Field Survey Data, 2018   Multiple Responses n= 120

Table 4. Distribution of Adaptation Strategies for climate change

Adaptation strategy	Frequency	Percentage
No adaptation	5	4.2
Use of resistant variety	36	30
Changing of time for land preparation	61	50.8
Mulching	80	66.7
Fertilizer application	78	65.0
Construction of drainage	25	20.8
Increase weeding	64	53.3
Increase Pesticide application	98	81.7

Source: Field Survey Data, 2018,   Multiple Responses

Table 5. Distribution of Challenges of climate change adaptation

Challenge	Frequency	Percentage	Ranking
Lack of support from government	106	88.3	1st
Inadequate extension service	104	86.7	2nd
Lack of agricultural technologies	101	84.2	3rd
Lack of finance	100	83.3	4th
Lack of information	93	77.5	5th
Tedious nature of adaptation strategies	83	69.2	6th
Poor access or control of land	51	42.5	7th

Source: Field Survey Data, 2018*Multiple Responses

3.5 Challenges of climate change adaptation

The result showed (Table 5) that majority (88.3%) of the respondents agreed on lack of support from the government a major constraint in adapting to climate change. Next was inadequate extension service 86.7%. Majority of the respondent did not have access to extension service and this poses a constraint to adaptation. Others were; Lack of agricultural technologies (84.2%), Lack of finance (83.3%), Lack of information (77.5%), tedious nature of adaptation strategy (69.2%). Only 42.5% of the respondents were constrained by poor access or control of land.

4. Conclusion and recommendations

The result of the study shows most of the farmers were aware of the changes in climate, most perceive it not to be severe. Most of the households had adopted one or more strategies to mitigate the negative effect of climate change. Nevertheless, this has not been without some limitation as they also indicated a number of constraints they encounter in their attempt to mitigate climate change impact. The farmers adopted different adaptation strategies to cushion the effects of Climate change. The study recommends that there should be clear government policy on climate change and its adaptation strategies so as to not only help boost agricultural production but rural farming income in Nigeria.

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