“Factors explaining farm households’ access to climate change information in Ilorin west local government area of Kwara State, Nigeria”

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Abstract

Climate change is a problem which many farmers had observed over the past few years. In this study, the authors analyzed perception on climate change and the factors influencing access to climate change information. The data were collected from randomly selected farmers and analyses were carried out with descriptive and probit regression. The results showed that 97.92 percent of the farmers already noticed climate change with 79.17 percent experienced floo-ding, 61.46 percent experienced some losses on their farms as a result of flooding. Also, 87.5 percent indicated that seasonal temperature had increased over time, while 83.3 percent claimed that seasonal precipitation had decreased and 91.7 percent hinted that seasonal timing of rain was early. The factors that influenced access to climate information were livestock/crop farming, use of hired labor, awareness of climate change, water scarcity, change in level of inputs, lack of climate and adaptation not cost effective ($p < 0.10$). It was recommended that efforts to enhance farm households' adaptation to climate should be strengthened with commitments to integrate adaptation mechanisms into the extension service delivery systems.

Keywords: climate change, information, extension, Nigeria.
JEL Classification: Q5, Q54, Q540, Q580.

Introduction

Climate change is one of the major threats to agricultural growth and development in many countries of sub-Saharan Africa (SSA). Despite initial divergent views by some researchers and policy makers, climate change is a reality that is no longer contestable or deniable. Specifically, its deleterious impacts have brought some changes into cropping seasons, and disrupted the stability of agricultural ecosystems sometimes with irreversible consequences. Domestic water supply and food productivity are all adversely affected while excessive rainfall often leads to flooding. Other consequences include fiercer weather, increased frequency and intensity of storms, floods, hurricanes, drought, increased frequency of fires, poverty, malnutrition and series of health and socio-economic consequences (NEST, 2004).

It is ironical and pathetic that developing countries that contribute the least to the problem are the most vulnerable because they are least endowed with adaptation resources. The economies of many of these countries also depend largely on agriculture, which happens to be the sector that is most sensitive to non-favorable climatic situation. More specifically, climate change affects agriculture in a number of ways. In some instances, uncertainty in the onset of the farming season due to rainfall instability often disrupts farm operations. In some instances, when early rains commence, they are often interrupted and un-sustained. Crops that may have been planted when rainfall initially commenced may wither due to inadequate rainfalls and excessive heat. Consequently, replanting of damaged crops is inevitable with very high probability of food shortage that may result from harvest failure (NEST, 2004).

Climate change is an offshoot of industrialization since it is caused by the presence of some gasses in the atmosphere, most of which are largely released during industrial production. Kandlinkar and Risbey (2000) noted that agricultural production is the major source of livelihoods for most rural communities in developing countries. Climate change will affect farm households which are the most vulnerable segment of most developing countries' populations. In Nigeria, agriculture is the sector of the economy with the highest foreign exchange earnings after oil. However, in terms of employment generation, about 70 percent of the work force is engaged in the agricultural sector. Agriculture contributes significantly to Nigeria's Gross Domestic Product (GDP). It is therefore a fact that cannot be contested to note that climate change will have greater negative impacts on poorer farm households not only for having the lowest capacity to adapt but for being primarily engaged in farming as a business.

Onyemechi (1987) noted that among the crops that are highly vulnerable to climate change, grains and cereals are foremost. It was emphasized that rapid increase in temperature can significantly impede production of crops like maize, guinea corn, millet and rice. In absence of functioning irrigation systems, water deficiency due to very low or erratic rainfalls can result in crop failure. Also, climate change is able to promote incidence of pests and diseases, and in some instances alter the genetical make of pest and disease causing pathogens for

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higher resistance to chemical controls. If planting is done too early and the rains do not persist, the planting is wasted. If the farmers to better face the consequences of extreme weather conditions (Adger et al., 2003). This is essential for fostering an economic development process that is sustainable and geared towards rapid human development as already spelt in the Millennium Development Goals (MDGs). Adaptation provides a mechanism to significantly contribute to reduction in the negative impacts from changes in climatic conditions as well as other changing socioeconomic conditions, such as volatile short-term changes in local first rain has arrived, farmer has to wait for some drying to take place in order for planting to be useful. If he waits too long and another rain arrives, then the waiting period has to be undergone again. If loses enough time speculating, the land is left unplanted.

Adaptation measures are important in order to help these poor and international market (Kandlinkar and Risbey, 2000). Adaptation in agriculture to climate change is an important component of climate change impact and vulnerability assessment and is one of the policy options in response to climate change (Smith et al., 1999). Without it, climate change is generally problematic for agricultural communities. Therefore, adaptation provides a framework for reducing climate change (Wheaton and Mclver, 1999). Adaptations in agriculture vary with respect to climate stimuli to which adjustments are made and according to the differing farm types and locations, and the economic, political and institutional circumstances in which the climate stimuli are made. It is therefore necessary to understand what types and forms of adaptation are possible, feasible and essential in the context of increasing vulnerability to climate change.

However, access to adequate information is a prerequisite for ensuring that illiterate farmers know exact ly what to do and how it should be done. Therefore, consistent with the promotion of adaptive capacity is the dissemination of information on climate change risks and vulnerabilities, and on the broad types of adaptations that stakeholders might consider (Smit and Skinner, 2007). This is always what differentiates the informed from the ignorant. The aim of this study is to analyze the factors influencing access to climate change information by farmers in Ilorin West Local Government Area of Kwara State, Nigeria. In the remaining sections of the paper, the materials and methods, results and discussion and conclusion are presented.

1. Materials and methods

1.1. Area of study. The study was carried out in Ilorin West Local Government Area of Kwara State, which was created from the defunct Ilorin Local Government in October 1991. Ilorin West Local Government is equally known as the premier local government council in the state hosts the headquarters of the emirate council. Ilorin West is located between latitude 8°30′ North and longitude 4°35′ East. According to the 2006 population census, the local government had a population of about 364,660 people. It is regarded as the most populated local government area in the state. It is made up of four districts of many villages. The districts are: Alanamu district, Ajikobi district, Magaji-Ngari district, Warah/Osin/Egbejila district. The districts are made up of eleven political wards, which are located within Ilorin City, and there are some villages under the eleven political wards, which are located outside the city, wherein the control and location of these villages are vested under the domain of district heads. The eleven political wards are: Ajikobi, Oju-Ekun, Sarumi, Alanamu, Ubandawaki, Adewole, Ogidi, Magaji-Ngeri, Oko-Erin, Badari, Olore, Baboko and Warah/Osin/Egbejila respectively.

In Ilorin West, the rainfall is fairly abundant, with a relatively high humidity. The area has two distinct seasons i.e. the dry season and raining season/wet season. It is also characterized by a temperature range between 60°F and 80°F. The area is suitable for growing crops such as yam, cocoa, guinea corn, maize, cassava, groundnut, vegetable, cowpea, soybeans among others. Some towns and villages are located along federal or state roads. The local government area has regional market days, which are held at an interval ranging from five to seven days, while some are everyday market in some areas in the local government. There are many commercial activities in the LGA; also there are commercial and community banks located in the major city and in some towns. Majority of the towns and villages have electricity, pipe-borne water, and boreholes. There are also primary, post-primary and tertiary institutions in the local government area. The LGA is made up of different tribes such as Hausa, Fulani, Nupes, Yoruba and Ibo. The major religion of the people in Ilorin West Local Government is Islam.

1.2. Source of data and sampling technique. The study used primary data that were collected using multi-stage sampling procedure. In the first stage, five villages were randomly selected from the identified fifteen villages in Ilorin West Local Government Area. In the second stage proportionate members of households were selected based on the population of each selected village in the area. A total of 100 questionnaires were administered, although four were rejected due to incomplete information.

1.3. Analytical methods. The data collected were analyzed using descriptive methods and probit regression. We also estimated a probit regression in order to determine the factors influencing the probabilities of having access to climate change information. The model is stated as follows:

$$Y = \beta_0 + \beta_1 x_1 + e_j,$$

$$Y = \beta + \beta_1(x_1) + \beta_2(x_2) \_\_\_\_\_\_ \beta_n(x_n) + e_j,$$

where Y = dependent variable, is access to information on climate change which was coded 1 if yes and 0 otherwise. The βs are the coefficients of the independent variables which were specified as marital status (single = 1, otherwise 0), educational status (no formal education = 1, 0 otherwise), farming experience (years), farm size (ha), livestock/crop farming (yes = 1, 0 otherwise), used hired labor (yes = 1, 0 otherwise), awareness of climate change (yes = 1, 0 otherwise), migration from one farmland to another (yes = 1, 0 otherwise), shifting cultivation (yes = 1, 0 otherwise), crop diversification (yes = 1, 0 otherwise), water scarcity (yes =1, 0 otherwise), change in level of inputs (yes =1, 0 otherwise),

Lack of information about climate change (yes = 1, 0 otherwise), lack of knowledge about adaptation (yes = 1, 0 otherwise), rationing of input other than water (yes = 1, 0 otherwise), insecure property rights (yes = 1, 0 otherwise) and adaptation not cost-effective (yes = 1, 0 otherwise).

2. Results and discussions

2.1. Socio-economic characteristics of the respondents.

Table 1. Socio-economic characteristics of the respondents

	Frequency	Percentage
25 < 35	18	18.75
35 < 45	22	22.92
45 < 55	27	28.13
55 < 65	16	16.67
65 < 75	7	7.29
≥75	6	6.25
Gender		
Male	78	81.25
Female	18	18.75
Marital status		
Single	3	3.13
Married	74	77.08
Widow	19	19.79
Educational status		
No formal education	43	44.79
Primary education	28	29.17
Secondary education	20	20.83
Tertiary education	2	2.08
Adult education	3	3.13
Farming experience (years)		
<20	54	56.25
20 < 40	32	33.33
≥ 40	10	10.42
Household size		
1 – 5	17	17.71
6 – 10	60	62.50
11 – 15	12	12.50
16 – 20	5	5.21
21 – 25	2	2.08

The results in Table 1 reveal that 18.75 percent of the farmers were young (< 35 years) while 13.54 percent were old (65 years and above). The table also reveals that majority of the farmers (51.05 percent) fell within the age group 35 < 55 years. With 16.67 percent being 55 < 65 years old, and in addition to 13.54 percent that were 65 years and above old, the labor force is gradually tending towards being ageing. This can be further buttressed by the fact that average age of the farmers is 48.46 years.

Table 1 also shows that 81.25 percent of the respondents were males, while 18.75 percent were female. This is expected in a rural population where males dominate farming activities. Also, 77.08 percent of the respondents were married, 3.13 percent were single and 19.79 percent were widowed. Because of educational limitations, farmers are able to marry early in order to get supports for farming from the wife and the children. In many traditional agriculture, marriage is therefore an investment decision that produces children that will eventually form the family labor force. Conventionally, high family size may serve as insurance against adverse climatic situations. It may as well expose the farmers to higher vulnerability.

The distribution of the respondents according to their educational levels is also presented in Table 1. It shows that majority of the farmers (44.79 percent) did not have any formal education. The respondents with tertiary education constituted 2.08 percent, those with secondary education were 20.83 percent and those with primary education were 29.17 percent. Education is an important driver of climate change adaptation because it facilitates ability of the farmers to take cogent decisions which may be in the form of crucial behavior change after carefully understanding the consequences. Education can also enhance information seeking habit, thereby making the farmers to be placed at the frontier of knowledge. This is often translated into vital decision making mechanisms in relation to adapting or mitigating the impact of adverse situation.

Table 1 also presents the results for the distribution of farmers' farming experience. It shows that 10.42

percent had been farming for more 40 years or more, 33.33 percent were between 20 and 39 years and 56.25 percent were less than 20 years. Although farmers with more years of farming experience are likely to notice trends of climate change, their agedness may limit uptake of any concrete measures to mitigate the impacts. The distribution of household size shows that 62.50 percent of the farmers had 6 to 10 members, while household size of 21 to 25 had the lowest percentage of 2.08 percent. Smallness of household size can limit availability of labor for households' production activities and may as well reduce the eagerness to adapt measures to cope with climate change.

2.2. Awareness of climate change.

Table 2. Distribution of respondents by awareness and the form of climate change

Awareness/form of climate change	Frequency	Percentage
Aware		
No	2	2.08
Yes	94	97.92
Experience of flooding		
No	20	20.83
Yes	76	79.17
Loss of experienced due to flooding		
Yes	59	61.46
No	37	38.54

Table 2 shows that 97.92 percent of the respondents noticed climate change, while only 2.08 percent claimed not to have noticed it. Since the majority of the respondents noticed it, it means they are likely to take measures to adapt. The table also reveals that 79.17 percent of the respondents experienced flooding on their farms. The table also shows that 61.46 percent of the respondents experienced losses as a result of flooding on their farms, while 38.54 percent reported no losses. This implies that some respondents that experienced flooding did not experience any loss.

Table 3. Distribution of respondents by their perception on some climate parameters

Perception on temperature	Frequency	Percentage
Increased	84	87.5
Decreased	8	8.3
No change	4	4.2
Perception on precipitation		
Increased	8	8.3
Decreased	80	83.3
No change	8	8.3
Change in timing of rain		
Late	8	8.3
Early	88	91.7

Table 3 shows that 87.5 percent of the respondents indicated that seasonal temperature had increased over time, 8.3 percent indicated that it had decreased over time while 4.2 percent did not consent to any change in temperature. Majority of the farmers were aware of climate change, which could have influenced their adaptation measures. The table further shows that 83.3 percent of the respondents claimed that seasonal precipitation had decreased over time, and 8.3 indicated that total precipitation had increased and 8.3 saw no change in the precipitation. This was also an indication that majority of the farmers were aware of climate change and could also encourage them in taking adaptation measures. Also, 91.7 percent of the respondents said that the seasonal timing of rain was early while 8.3 percent said that it was late.

2.3. Factors influencing access to climate change information. Multivariate probit results in Table 4 confirm that livestock/crop farming, use of hired labor and awareness of climate change are statistically significant at 10% while water scarcity is statistically significant at 5%. Change in level of inputs, lack of climate and adaptation not cost effective are statistically significant at 1%. Educational status, farming experience, farm size, use of hired labor, migration from one farmland to another, shifting cultivation, crop diversification, change in input, lack of weather information, lack of climate change information, lack of knowledge about adaptation, insecure property rights and adaptation not cost effective have negative coefficients. This implies that reduce the probability of households' access to climate change information. Educational status, use of hired labor, migration from one farmland to another, shifting cultivation, crop diversification, water scarcity, change in inputs and lack of weather information are dummy variables and they decrease the probability of having access to climate change information. Marital status, livestock/crop farming, awareness of climate change, water scarcity and rationing of inputs other than water have positive coefficients. This also implies that they have positive impact on households' probability of having access to climate change information.

Table 4. Probit regression of the factors influencing access to climate change information

Variables	Coefficients	Z	P>/Z/
Marital status (single = 1, otherwise 0)	1.59286	1.26	0.204
Educational status (no formal education = 1, 0 otherwise)	-.0904596	-0.94	0.348

Table 4 (cont.). Probit regression of the factors influencing access to climate change information

Variables	Coefficients	Z	P>/Z/
Farming experience (years)	-.0104717	-0.29	0.770
Farm size (ha)	-.1905577	-0.94	0.348
Livestock/crop farming (yes = 1, 0 otherwise)	4.630631	1.94	0.052*
Used hired labor (yes = 1, 0 otherwise)	-2.747761	-1.73	0.084*
Awareness of climate change (yes = 1, 0 otherwise)	4.100945	0.96	0.335
Migration from one farmland to another (yes = 1, 0 otherwise)	-.2939819	-0.19	0.849
Shifting cultivation (yes = 1, 0 otherwise)	-3.060309	-1.71	0.087***
Crop diversification (yes = 1, 0 otherwise)	-1.897566	-1.60	0.111
Water scarcity (yes = 1, 0 otherwise)	1.995476	2.54	0.011**
Change in level of input (yes = 1, 0 otherwise)	-4.712834	-3.24	0.001*
Lack of information about climate change (yes = 1, 0 otherwise)	-6.696207	-3.50	0.000*
Lack of knowledge about adaptation (yes = 1, 0 otherwise)	-.1191315	-0.15	0.878
Rationing of input other than water (yes = 1, 0 otherwise)	.0783926	0.15	0.878
Insecure property rights (yes = 1, 0 otherwise)	-1.245137	-1.37	0.170
Adaptation not cost-effective (yes = 1, 0 otherwise)	-2.686078	-2.63	0.009*
Constant	4.526801	0.87	0.387

Notes: *** = 1% significant. ** = 5% significant Goodness of fit = 0.7688. * = 10% significant. Maximized value of the log – likelihood function=-14.781815.

Conclusion

Climate change is a problem which many farmers had observed over the past few years. Perception of climate change is a prerequisite for adaptation. From the analysis of the data collected, it was revealed that large number of farmers already perceived changes in climate. Farmer should adjust their management practices to ensure that they make use of the limited rainfall and water resources for food production and other needs. The farmers should use adaptation measures in a complementary ways and not as independent strategies. For instance, use of irrigation technologies should be accompanied by other crop management practices. Supporting farmers in increasing these adaptation measures through providing the necessary resources such as credit, information and training can significantly help farmers increase and sustain high productivity levels even under changing climatic conditions. Government policies need to support research and development that develops and diffuses the appropriate technologies to help farmers adapt to changes in climate conditions. This emphasizes the fact that farm households' adaptation to climate should be strengthened with commitments to integrate adaptation mechanisms into the extension service delivery systems.

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