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PERCEIVED EFFECTS OF CLIMATE VARIATION ON PRODUCTION AND LIVELIHOOD OF CROP FARMERS IN IDO LOCAL GOVERNMENT AREA OF OYO STATE, NIGERIA

***ADEOYE, A.S., OKE, O.O., OJO-FAKUADE, F.F., JATTO, K.A. AND ADELUSI, F.T.**
Department of Agricultural Extension and Management, Federal College of Forestry, P.M.B. 5087, Jericho Hill, Ibadan, Nigeria
*Corresponding author: saadeoye06@gmail.com

Abstract
The severe effect of climate change in Sub-Sahara Africa, and Nigeria is highly evident in drought, increased temperature, heavy rainfall, and incessant flooding which has led to loss of farm commodities and loss of lives. However, the study was predetermined by the persistent impact of climate variation from loss of plants, deaths of animals, and diversification of crop farmers into other means of livelihood. This study was carried out in Ido Local Government Area of Oyo state to investigate the perceived effect of climate variation on crop farmers' livelihood. A well-structured questionnaire was used for collection of data through purposive and simple random sampling procedure to select a sample of 86 crop farmers for the study. The data for the study were analyzed with descriptive statistics such as frequency tables, percentages, and inferential statistics like chi-square and Pearson Product Moment Correlation to draw inferences between the variables of the hypotheses. The findings of the study revealed that majority of the respondents (73.3%) were male, with age range of 31-60, and 82.6% were married. The result revealed that 72.1% of crop farmers have one form of formal education or the other. Majority of the crop farmers (87.2%) got climate related information from their farmers association, and 79.1% got information from their radio sets. However, 58.1% of the respondents perceived severe effect of climate variation on farmers' livelihood which invariably influences diversification into other businesses. Furthermore, the result revealed that significant influence between crop farmers' education and perceived effect of climate variation on their livelihood ($p < 0.05$), and farmers' sources of information on perceived effect of climate variation. In conclusion, the study revealed that most crop farmers perceived severe effect of climate variation on their production which invariably influences livelihood diversification. It is therefore recommended that crop farmers should access climate related adaptation strategies from extension offices/agents to enhance their production practices.

Key Words: *Climate Variation, Perception, Crop farmers, Production, Livelihood*

Introduction

Climate change effects are location specific and disproportionately distributed among different countries (IPCC, 2007). In Africa, climate change is already having serious negative effect where much of the population is suffering from direct result of increased in temperatures, changed rainfall patterns and rise in sea level. The impact of climate change is more severe in Sub-Sahara Africa where agriculture is the most important economic activity and source of food income (Book *et al*., 2007). Climate change has been the major constraint to both crop and livestock production (FAO, 2008). In Nigeria, it is well known fact that climate has varied in time and space and that it will continue to vary in future (Ojo, 1987). In Southeast Nigeria, droughts have been relatively less persistent, while rainfall is observed to be increasing and temperature increases and reduces moderately over the years compared with Northern Nigeria (Okorie *et al*., 2012). In Northern Nigeria, drought caused death of many animals and about 60% drop in crop yield (IPCC, 2007). In Oyo, Southwestern Nigeria, flooding has resulted into loss of lives and nearly 2000 people were displaced (Nigeria Meteorological Agency, 2008). The 2012 flood also displaced farmers from their farms, and forced them into premature harvesting to save their yield (Muhammed, 2012). Climate variability could markedly affect income from agricultural production, increase costs to consumers and could also lead to scarcity. Eboh (2009) reposed that the effects of climate manifest through changes in land and water regimes, specifically changes in the frequency and intensity of drought, flooding, water shortages, worsening soil condition, desertification, diseases and pest out breaks on crops and livestock. Livelihood activities of the crop farmers are related to their endowment of social, human, financial, physical and natural assets (Nkonya *et al*., 2004). The effect of natural disaster from climate variation is visible in the changes in the environment which invariably affect the rural livelihood through their impact on agricultural production and income (Chinweze *et al*., 2013). The environmental consequences of global warming have serious negative impact on livelihood and sustainable economies of local peoples (Wisner *et al*., 2003). The situation has become very critical because agricultural contributes significantly to livelihoods sustenance and poverty reduction in developing countries of which Nigeria is one. However, as a result of low yield, household of farmers may be forced to withdraw children from schools or spend less due to low income capacity (World Bank, 2011). Therefore, this study seeks to evaluate the perceived effect of climate variation on crop farmers' livelihood in Ido Local Government Area, Oyo state. The specific objectives were to examine the personal characteristics of respondents, examine the sources of information on climate variation on respondents' production, assess crop farmers' perception of climate variation on their production, and identify other means of livelihood of crop farmers due to climate variation. The hypotheses for the study are as follows; $H_0$1: there is no significant relationship between the personal characteristics of crop farmers and perceived effect of climate variation on livelihood, $H_0$2: there is no significant relationship between sources of information on climate change and perceived effect of climate variation on livelihood, and $H_0$3: there is no significant

relationship between other means of livelihood of crop farmers and perceived effect of climate variation on livelihood.

Methodology

Study Area

The study was carried out in Ido Local Government Area, Oyo state. It has an area of 986 km² with a population of 103,261 at 2006 Nigeria's population census. It lies between longitude 3° 47′ 34.99″E and latitude 9° 30′ 44.49″N. It is located in the forest belt zone and supports mostly food crops. Ido has a relatively high humidity and average daily temperature ranges between 25°C and 35°C throughout the year. Rainfall is about 1800 mm annually. The vegetation pattern consists of rainforest in the South and guinea savannah in the North. The climate favours cultivation of crops. The soil is extensively fertile and it is suitable for agriculture. The basic occupation of the people is farming. There are large hectares of grassland which are suitable for animal rearing, vast forest reserves and rivers. The inhabitants of the area grow varieties of cash crops such as banana, plantain, cocoa, kola nut, palm oil, timber, and arable crops like maize, yam, cassava, rice, vegetables etc. The area is also suitable for a wide range of edible fruits.

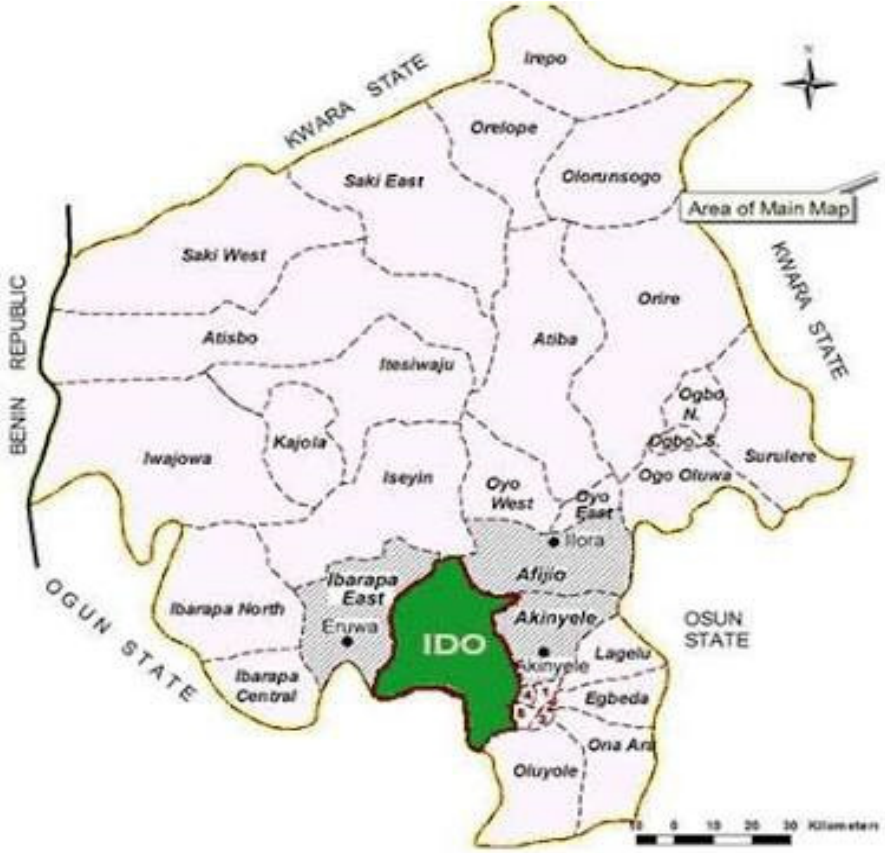

Fig. 1: Map of Oyo State showing Ido Local Government Area

Sample and Sampling Procedure

The four main villages known for crop farming in Ido Local Government were selected with purposive sampling procedure (i.e. Akufo village, Omi Adio village, Akindele village, Akinware village). The primary data used for the study was obtained from 86 crop farmers across the villages by random sampling. A well-structured questionnaire was used in collecting the data. Data collected were analyzed using frequencies, simple percentages, and chi-square and PPMC as inferential statistical tool to test for relationship between the dependent and independent variables.

Results and Discussion

The Personal Characteristic of the Respondents

Table 1 revealed that majority of the respondents (66.4%) is between 30 – 49 years of age in the study area. This result implies reveals that the majority of the respondents are in their middle age and means that the farmers are predominantly in their active working age. The result further showed that most of the respondents were males (73.3%). This implies that there are more males as household heads in the study area. This result is in line with the findings of Onyekuru (2011) who reported that most household heads are usually male except in cases where female are heads due to the demise of their husbands. The result revealed that 82.6% of the respondents were married. This implies that majority of the farmers are responsible and reasonable to understand the effect of climate variation on their production. This corroborates with the findings of Johns *et al*. (2003) that married people are mutually responsible adults in the society. The result also revealed that majority of the respondents (72.1%) has formal education ranging from primary (43.0%), secondary (18.6%) and tertiary education (10.5%). This implies that high level of literacy among the crop farmers may have influence their perception of climate variation on their livelihood. This is in line with Falaki *et al*. (2013) which states that high level of literacy has influence on the perception of the rural small-holders for climate variation. Table 1showed that majority of the respondents (50.0%) earn between ₦30,000 and ₦50,000. This means that most farmers in the study area produced on a small scale level which could be as a result of climate variation. Therefore, this implies that more information on climate variation should be disseminated to crop farmers in the study area to maximize earnings.

Table 2 revealed that 26.7% of the crop farmers got information from extension agent on a weekly basis. The study also indicate that 87.2% got climate related information among the farmer association either on daily, weekly, forthrightly and monthly basis. The result further revealed that majority of the respondents (79.1%) on daily, weekly, forthrightly and monthly got climate variation information through radio.

Table 3 revealed that majority of the crop farmers' perceived severe effect of climate variation on their production with 55.8% of them strongly agreed that they experience heavy rainfall. Based on respondents' categorization, 58.1% of the crop farmers perceived severe effect of climate variation on farmers' livelihood. This is in line with Olajide (2014) which states that farmers are faced with myriads of environmental problems which have been blamed on climate variation.

Table 1: Distribution of selected personal characteristics of crop farmers (N = 86)

Variable	Frequency	Percentage
Age		
19-29	5	6
30-39	27	31.5
40-49	30	34.5
50-59	16	18.6
60-69	8	9.4
Sex		
Male	63	73.3
Female	23	26.7
Marital status		
Single	6	7
Married	71	82.6
Divorced	9	10.4
Education		
No formal education	24	27.9
Primary	37	43.0
Secondary	16	18.6
Tertiary	9	10.5
Farm yield (kg)		
100-250	12	13.9
251-500	57	66.3
>501	17	19.8
Income level (₦,000)		
30-50	43	50.0
51-100	15	17.4
101-200	28	32.6

Table 2: Source of Information available to farmers on climate change

Variables	No	Monthly	Fortnightly	Weekly	Daily
Extension Agents	42 (48.8%)	10 (11.6%)	6 (7%)	23 (26.7%)	5 (5.8%)
Farmers association	11 (12.8%)	15 (17.4)	5 (5.9%)	37 (43%)	18 (20.9%)
Friends and Relatives	15 (17.4%)	4 (4.7%)	7 (8.1%)	48 (55.8%)	12 (14%)
Internet	47 (54.7%)	2 (2.3%)	4 (4.7%)	22 (25.6%)	11 (12.8%)
Radio	18 (20.9%)	2 (2.3%)	1 (1.2%)	28 (32.6%)	37 (43%)
Television	39 (45.3%)	2 (2.3%)	3 (3.5%)	22 (25.6%)	20 (23.3%)
Fellow Farmers	25 (29.1%)	4 (4.7%)	8 (9.3%)	38 (44.2%)	11 (12.8%)

Table 3: Perception of crops farmers on effect of climate variation on their production

Variables	SA	A	U	D	SD
Frequent heavy rain affect crops on the farm	48(55.8%)	38 (44.2%)	0 (0%)	0 (0%)	0 (0%)
Delayed rain in planting season results in stunted growth	44 (51.2%)	40 (46.5%)	2 (2.3%)	0 (0%)	0 (0%)
Flood occurrences destroy crops in the field	58 (67.4%)	27 (31.4%)	1 (1.2%)	0 (0%)	0 (0%)
Ineffectiveness of fertilizer due to harsh weather	38 (44.2%)	27 (31.4%)	15 (17.4%)	2 (2.3%)	4 (4.7%)
Delayed Germination	37 (43%)	24 (27.9%)	7 (8.1%)	17 (19.8%)	1 (1.2%)
Increased sun intensity lead to drying of seedlings	41 (47.7%)	34 (39.5%)	7 (8.1%)	4 (4.7%)	0 (0%)
Quick decay of crops in harvest due to heat intensity	38 (44.2%)	22 (25.6%)	8 (9.3%)	14 (16.3%)	4 (4.7%)

SA: Strongly Agreed, A: Agreed, U: Undecided, D: Disagreed, SD: Strongly Disagreed

Table 4 showed that majority of the respondents (58.1%) ventured into trading as an alternative means of livelihood, 37.2% lived on commercial transport apart from farming, and 39.5% practiced farm labour, while only 33.7% lived on security jobs. Also 52.3% of the respondents diversified into marketing of various farm produce while 38.4% strongly agreed on urban migration. This corroborates with Solomon *et al.* (2007) which says Nigeria can move from under developed to developing country if we provide employment through agriculture, thereby making young people remain in their home towns.

Table 4: Other means of livelihood of crop farmers due to climate variation

Variables	SA	A	U	D	SD
Trading	50 (58.1%)	32 (37.2%)	4 (4.7%)	0 (0.0%)	0 (0.0%)
Commercial Transport	32 (37.2%)	32 (37.2%)	4 (4.7%)	18 (20.9%)	0 (0.0%)
Farm Labour	34 (39.5%)	26 (30.2%)	9 (10.5%)	16 (18.6%)	1 (1.2%)
Security Guard	29 (33.7%)	15(17.4%)	6 (7%)	31 (36%)	5 (5.8%)
Agrochemicals business	33 (38.4%)	37 (43%)	8 (9.3%)	6 (7%)	2 (2.3%)
Marketing diversification	45 (52.3%)	13 (15.1%)	15(17.4%)	4 (4.7%)	9(10.5%)
Urban migration	33 (38.4%)	26 (30.2%)	15(17.4%)	6 (7%)	6 (7%)

SA: Strongly Agreed, A: Agreed, U: Undecided, D: Disagreed, SD: Strongly Disagreed

Hypotheses testing

$H_0$1: Chi-square analysis of personal characteristics of crop farmers and perceived effect of climate variation on livelihood in the study area

Table 5 revealed that is significant relationship between educational status and the perceived effect of climate variation on the livelihood of crop farmers in the study area ($\chi^2 = 24.570$, $p < 0.05$). This implies that farmers are knowledgeable and understand the impact of harsh climatic condition on their production and that might influence their diversification into other livelihood activities.

Table 5: Chi-square distribution

Variable	χ^2 –value	p- value	Decision
Sex	1.025	0.795	Not significant
Religion	3.777	0.707	Not significant
Marital status	5.349	0.803	Not significant
Educational status	24.570	0.003	Significant

$H_0$2: PPMC analysis of sources of information on climate variation and perceived effect of climate variation on crop farmers' livelihood in the study area

Table 6 revealed that there is significant relationship between the sources of information and the perceived effect of climate variation on the livelihood of crop farmers in the study area. The result implies that respondents' sources of information have great influence on the perceived effect of the climate variation on their livelihood. This implies that information is a necessary tool that increases knowledge and awareness of farmers on the impact of climate variation on their production.

Table 6: PPMC analysis

Variable	r-value	p-value	Decision
Source of information versus Perceived effect of climate variation on crop farmers' livelihood	-0.225	0.038	Significant

$H_0$3: PPMC analysis of other means of livelihood of crop farmers and perceived effect of climate variation on crop farmers' livelihood in the study area

Table 7 reveals that there is no significant relationship between the perceived effect of climate variation on other means of livelihood of crop farmers in the study area. This result implies that climate variation may not be the major factor responsible for crop farmers' diversification into other means of livelihood. This is corroborated by Makate *et al*. (2016) that climate variation may not be responsible for crop farmers' diversification into other business but lack of access to land, poor assets and poor access to agricultural extension services could be the major cause of diversifying into other business ventures.

Table 7: PPMC analysis

Variable	r-value	p-value	Decision
Other means of livelihood of farmers versus Perceived effect of climate variation	0.063	0.565	Not significant

Conclusion

Findings showed that majority of the crop farmers perceived severe effect of climate variation on their production in the study area with farmers association being the most used source of information for climate variation among them, while the most frequently used ICT device is radio because it is affordable. The study also revealed the severity of delayed rainfall in

planting season, increased sun intensity, flood occurrence, and delayed germination which affect the livelihood of the farmers. However, most of the farmers diversified into other means of livelihood due to the effect of climate variation on their production. It is revealed that the crop production in study area is greatly affected by climate variation and will gradually reduce the number of crop farmers.

Recommendation

Crop farmers should access agricultural information on adaptation strategies to climate variability from research related climate change agencies, extension offices/agents that will enhance their climate adapted production practices that will further strengthen crop farming as their major source of livelihood. Farmers in the study area should diversify into agricultural related ventures to ensure continuous faming activities.

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