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Farmers' Perception of the Effect of Climate Change on Crop Production In Egbedore Local Government Area of Osun State, Nigeria

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Abstract: ***The study was carried out to gain a better understanding of the effect of climate change on agricultural production in Egbedore Local Government Area of Osun State. A simple random sampling procedure was used to sample respondents using the list of registered farmers obtained from the local government. The findings of the study revealed that 44.3 percent of the respondents were in the age range of 41–59 years which is the highest percentage compared to other age grouping in the study. Also, majority of the respondent (69.2%) were males and 68.3percent were married with mean farm size of 0.82ha. Moreover, 61.7% of the respondents perceived the effect of climate change in the study area as high. Farming experience (t=2.298; p<0.05) and farm size (t=2.129; p<0.05) had positive and significant relationship with constraints faced in managing the effect of climate change. The study concludes that the farmers are aware of the effect of climate change on crop production but face constraints in managing the effect. More training should be given to farmers by the extension personnels on best practices to manage climate change effect while the low level of education of the farmers be considered while organising training in order to make it effective since most of the farmers do not have formal education.***

Keywords: Perception, Crop, Climate change, Constraints, Farmers

1. Introduction

According to Intergovernmental Panel on Climate Change [1], climate change refers to any change in climate over time that alters the composition of the global atmosphere and in addition to natural climate the variation is observed over comparable time period. It has taken a centre point in the midst of diverse threatening environmental challenges facing the planet earth stimulating discourse and counter vis-à-vis causes, long term effects and how to forestall the lingering and frustrating negative impacts. Reducing hunger and poverty are the key United Nations Millennium Development Goals but climate change is one of the main sources of uncertainty and risk in many agricultural systems around the world of which agriculture is the most weather dependant of human activities [2] and most production decisions directly or indirectly involves a consideration of this factor but farmers usually do not know what climate to expect in the following growing season. In West Africa, a creeping desertification is in progress, with 1,350 square miles of Nigerian land turning into desert each year, uprooting farmers and herdsmen and causing internal migration towards coastal areas [3].

Climate variability comes in different forms; it may be floods, droughts or tropical cyclones. Climate variability associated with impacts on crop produce varies from year to year and has resulted to significant increase in crop production loss during certain years due to the occurrence of extreme climate events [4]. For instant, between 1997 and 1998 farmers in the countries around the world lost more than 50percent of their total production. It also caused water shortages, forest fires and human health impacts [5]. Plant growth stages need to correspond to perfect weather conditions to reach its top yield potential. Stresses such as lack of moisture or fertility increases time between vegetative growth stages and decrease the time between reproductive stages. Temperatures at planting and beyond also have significant controls over growth rates [6].

Climate Change is a major hindrance to production and profitability. Crop production is affected by climatic extremes such as either flooding during wet seasons and drought during dry seasons. Skilful seasonal climate forecast information could become important to farmer's production decisions because information would help farmers in their decision making regarding farm activities while farm management practices can be formed better with the aid of seasonal climate forecast. The impacts of global climate change on agricultural production are a serious source of worry to farmers in sub-saharan Africa. This is because their economies mainly depend on agriculture which is now affected by climate change catastrophes [7]. Also, assessment of the vulnerability of agricultural sector to climate change is very important because it contributes about 60 to 70 percent labour force and 30 to 40 percent GDP [8], opined that, the. Based on the foregoing, the study considered the following objectives;

1. Describe the socio-economic characteristics of the respondents
2. Investigate the farmers' perception of the effect of climate change on crop production
3. Know constraints faced by the farmers in managing the effect of climate change
4. Investigate the relationship between constraints faced in managing the effect of climate change and some selected characteristics of the farmers

2. Methodology

The study was carried out in Egbedore Local Government Area of Osun State with its headquarters in Awo. It is located in the tropical rainforest to south and savannah in the north. Its vegetation is suitable for agriculture and animal

husbandry. The greater populations are predominantly peasant farmers who cultivate permanent crops such as cocoa, oil palm, Citrus, cashew and mango. Food crops planted in the area include maize, yam, cassava, cowpea and vegetables, some other fruits planted in the area are banana, plantain, pineapple and sugar cane. They are also notable for cocoa farming and oil palm processing.

Its headquarters is in the town of Awo. It has an area of 270km^2 and a population figure 74,435 [9]. Primary data were collected by the use of a structured interview schedule to elicit information from the respondents. The population of the study were farmers in the study areas. A simple random sampling procedure was used to select six towns in the study area which are; Ido Osun, Okinni, Iragberi, Egbedi, Awo and Ofatedo. Twenty (20) respondents were selected from each town to give a total number of 120 respondents.

The data were presented using descriptive statistics such as frequency distribution and percentage. A 3-point scale of Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree which was assigned the score of 5,4,3,2 and 1 respectively was used to determine the perceived effect of climate change on crop production. The inferential statistic used was Ordinary Least Square Regression (OLS). The regression model is specified as follows;
$Y=f(X_1+X_2+X_3+X_4+X_5+X_6+X_7+X_8+X_9+e)$ Where,

Y=Sum of constraints faced in managing the effect of climate change, X_1=Sex (Dummy), X_2=Marital status(Dummy), X_3=Farming Experience, X_4=Age, X_5=Farm Size, X_6=Years spent in highest education, X_7 = Family size, X_8= Number of dependants, X_9=Perception of Climate change effect

3. Results and Discussions

3.1 Socio-Economic Characteristics

Age distribution of the respondents as shown on table 1 indicates that the mean age of the respondents was 47.4 years with many (44.3%) within the age range of 41 to 59 years and the least age group (8.3%) was 71 and above. This implies majority of the respondents were still in their active years and might be in need of training to increase their knowledge since at this age farmers will be very willing to learn how to bring about improvements in their farm work. About 70 percent of the respondents were male, 68.3 percent were married and more than half (51.7%) had a family size less than 5 people. The majority (71.7%) of the respondents had vocational education, 20percent had adult education and few (8.3%) did not have any informal education. About half (49.2%) of the respondents had formal education for 4 to 7 years with mean years of formal education of 3.2 years. This implies the respondents had very low level of education and will greatly need assistance of extension agent in order to fully understand climate changes as it affects agriculture since all (100%) the respondents had farming as their primary occupation.

The respondents had small land holdings with mean of 0.82 hectares as 73.3 percent had between 0.1 and 1.0 hectares, 21.7 percent had 1.1 to 2.0 hectares and 5 percent had 2.1 to 4.0 hectares of land. Going by the classification that farmers with holding ranging from 0.10 to 5.99-hectares are small-scale farmers [8], it implies that all these respondents can be classified as small scale farmers. This further shows the dare need of farmers to understand climate change so as to manage their resources to cope in the mist of challenges posed at farmers by climate change. Also, 62.5 percent had been in farming for 2 to 10 years. The mean year of farming was 12.2 years. Cassava (100%), Maize (100%), Sweet potato (56.7%) and Yam (47.5%) were the most cultivated crops. This implies that maize and cassava were the most widely cultivated crop this might be because the two combinations (cassava and maize) give optimal contribution to the gross margin [10]

Table 1: Distribution of respondents by socio-economic characteristics

Socio Characteristics	Frequency	Percentage
Age (years)		
20-30	14	11.7
31-40	30	25
41-60	53	44.3
61-70	13	10.7
71 above	10	8.3
Mean=47.4years		
Sex		
Male	83	69.2
Female	37	30.8
Marital Status		
Single	14	11.7
Married	82	68.3
Widow/er	10	8.3
Divorce	7	5.8
Separated	7	5.8
Family Size		
Less than 5	62	51.7
5 – 10	54	45.0
12 – 2	4	3.3
Mean=4.9years		
Informal Education		
None	10	8.3
Adult Education	24	20.0
Vocational Education	86	71.7
Formal Education (Years)		
None	18	15.0
1-3	43	35.8
4-7	59	49.2
Mean= 3.2 years		
Primary Occupation		
Farming	120	100
Farm Size (Hectares)		
0.1-1.0	88	73.3
1.1-2.0	26	21.7
2.1-3.0	3	2.5
3.1-4.0	3	2.5
Mean=0. 82ha		
Farming experience (years)		
2-10	75	62.5
11-20	29	24.2
21-43	16	13.3
Mean=12.24years		
Crops Cultivated		
Cassava	120	100.0

Maize	120	100.0
Cowpea	20	16.7
Sweet Potato	68	56.7
Tomato	44	36.7
Pepper	46	38.3
Okra	35	29.2
Yam	57	47.5
Cocoa	20	16.7
Plantain	8	6.7

Source: Field Survey

3.2 Farmers' Perception of the effect of climate change on crop production

The weighted mean perception scores were ranked in descending order of the effect of climate change on crop production as shown in Table 2. It showed that the respondents were highly aware of the effect of climate change on crop production in the study area except that the farmers do not agree that land portions have been less suitable for crop cultivation (2.73). This might be because the small holdings of the farmers as shown in table 1 where the mean farm size is 0.82ha constrained them from regarding any land portion as not suitable for cultivation. This also emphasises the reason farmers do not practise shifting cultivation in managing the effect of climate change on crops. This practice therefore, contradicts the opion that many adaptation and mitigation options can be combined to address climate change, because no single option is sufficient by itself [11].

Respondents who perceived the effect of climate change on crop production was high (61.7%).

Table 2: Distribution of respondents' perceived effect of climate change on crop production

Statements	WMS	Rank
Climate change has resulted in changes in weather pattern, thereby making them unpredictable and unreliable	4.71	1
It has resulted in increased cost of production	4.4	2
Results to practices that maintain soil moisture, such as mulching to effectively reduce evaporation from the soil and make crop yield good	4.32	3
Late commencement of rainfall causes adverse effect on crops in terms of germination and growth.	4.30	4
Changes in climatic factors affect planting time and makes planning difficult	4.20	5
The increase in drought will not lead to increase in crop yield.	4.14	6
Increase in temperature does not make the plant grow well because of heat stress.	4.10	7
Climate change has resulted to the need for more use of fertilizer in improving and conserving soil structure better	3.83	8
Unpredictable weather changes favour disease prevalence which affects crop sustainability	3.35	9
Increased flooding causes erosion and also reduces crop growth	3.03	10
Land portions have been less suitable for crop cultivation	2.73	11
Level of perceived effect of climate change on crop production	**Frequency**	**%**
Low	46	38.3
High	74	61.7

WMS: **Weighted Mean Score**

3.3 Major constraints in managing the effect of climate change

Respondents specified inadequate knowledge of handling climate change effect (1.57), lack of reliable information about weather and climate (1.57), lack of extension services and advice (1.33) and inadequate appropriate tools and equipment for farming (1.03) as likely constraints to effective management of the effect of climate change. Despite the fact that respondents who perceived the effect of climate change was high, they still acknowledge that they have a lot more to learn about climate change.

Table 3: Major constraints in managing the effect of climate change

Constraint	Mean
Inadequate knowledge of handling climate change effect	1.57
Lack of reliable information about weather and climate	1.57
Lack of extension services and advice	1.33
Inadequate appropriate tools and equipment	1.03

3.4 Result of OLS showing the relationship between constraints faced in managing the effect of climate change and some selected characteristics of the farmers.

The result of the analysis on table 4 revealed that farming experience (t=2. 298; $p<0.05$) and farm size (t=2. 123; $p<0.05$) had positive and significant relationship with constraints faced in managing the effect of climate change. This implies that as the farmers increase in their farming experience the more the constraints faced in managing the effect of climate change. This implies that, the farmer's experience has not helped them in managing their farms against climate change effects. This corroborates the findings that without additional mitigation efforts beyond those in place today, and even with adaptation, warming by the end of the 21st century will lead to high then to very high risk of severe, widespread and irreversible impacts globally [11]. Also, as the farmers increase their farm size, the more the constraints faced in managing the effect of climate change. This calls for greater commitment of extension personnels to ensure that farmers adopt best practises for managing their farms. The coefficient of determination was 0.702 implying that 70% of the constraints faced in managing the effect of climate change by the farmers was explained by the variables included in the model.

Table 4: OLS showing the relationship between constraints faced in managing the effect of climate change and some selected characteristics of the farmers.

Determinants	Regression	Std.	t-*value*	p-*value*
(Constant)	11.393	0.921	12.375	0.000
Sex	-0. 346	0.359	-0.964	0.337
Marital status	0. 265	0.380	1.362	0.488
Farming Experience	0.113	0.049	2.298	
Age	-0.010	0.021	-0.415	0.482
Farm Size	0.666	0.314	2.123	0.036**
Years spent in	0.141	0.102	1.380	0.170

Family size	0.025	0.090	0.276	0.783
Number of	0.177	0.226	0.780	0.437
Perception of climate	0.537	0.541	0.992	0.323

**Significant at 0.05, R^2=0.702 =70.2%

4. Conclusion and Recommendations

The study concludes that the farmers are aware of the effect of climate change on crop production and based on the findings of the study it is recommended that;

1. Farmers groups, governmental and non-governmental extension organization should organize training programmes on various strategies farmers can effectively combine to manage their farms against the effect of climate change.
2. There should be government assistance in terms of supply of drought resistant variety of crops and should see to land management procedures that will grant farmers access to land.
3. Extension organizations while planning training programmes should consider the low level of education of the farmers so as to fully benefit them through the programmes.

References

[1] IPCC, Climate Change 2001: Impacts, Adaptation, and Vulnerability. Report edited by McCarthy J.J. *et al.*, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK. 2001.

[2] Oram P. A., . The effect of climate change. Sensitivity of agricultural production to climate change, an update. Climate and Food Security. IRRI Manila, The Philippines, pp. 25-44, 2000.

[3] Walter Fust (2009). Forum 2009: Climate Change- The Anatomy of a Silent Crisis. http://www.ghf-ge.org/human-impact-report. Retrieved on 20/12/2014

[4] Asian Disaster Preparedness Center (ADPC), , Asian Disaster Management News, Extreme Climate Events. Vol. 4(1) 1998.

[5] Cruz, . Susceptibility of cereal microflora to oxygen deficiency and carbon dioxide concentration. Hammer and Mc cown 1995. Review of current evidence on climate forecasts and their economic effects on agriculture. American Journal of Agricultural Economics 80, 1089-1095, 2003.

[6] Mc Williams. Effect of temperature on Climatic factors. Value of perfect forecasts of sea surface temperature anomalies for selected rain-fed agricultural locations of Chile. Agricultural and Forest Meterology 116, 117-135 2001.

[7] Luka, E. G. and Yahaya, H . Sources of Awareness and Perception of the Effects of Climate Change among Sesame Producers in the Southern Agricultural Zone of Nasarawa State, Nigeria. Journal of Agricultural Extension Vol. 16 (2) 2012.

[8] Apata, T.G., Folayan, A, Apata, O.M. and Akinlua, J. The Economic Role of Nigeria's Subsistence Agriculture in the Transition Process: Implications for Rural Development. 85th Annual Conference of the Agricultural Economics Society. Warwick University. 18 - 20 April 2011

[9] Nigeria Population Census (NPC) 2006 http://www.nigerianstat.gov.ng/nbsapps/Connections/Pop2006.p... Retrieved 20/12/2014

[10] Bamiro O. M., Afolabi M. and Daramola F. Enterprise Combinations in Cassava Based Food Crop Farming System in Nigeria: Evidence from Ogun State Greener Journal of Agricultural Sciences Vol. 2 (1), pp. 13-20, 2012. www.gjournals.org

[11] IPCC, Climate Change: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp 2014.