



# **Farmers Perception On Effects Of Climate Change On Cocoa Production In Ibarapa/Ibadan Agricultural Zone Of Oyo State, Nigeria**

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## **ABSTRACT**

Climate change poses serious threat to agricultural development in many developing countries like Nigeria. This study focused on farmer's perception on effects of climate change on cocoa production in Ibarapa/Ibadan agricultural zone of Oyo State. Multistage random technique was adopted in obtaining the sample size of 126 respondents. Structured interview schedule was used to collect data from the respondents on personal characteristics, constraints facing farmers, source of information on climate change by farmers and perception of cocoa farmers on climate change. The data were subjected to both descriptive and inferential statistics. The results reveal that 67.5% of the respondents were male, 96.8% were married, 39.7% of respondents falls between 41-50Years. It was also revealed that significant relationship exist between age ( $x=68.239, p<0.05$ ), sex ( $x=40.245, p<0.05$ ), marital status ( $x=35.909, p<0.05$ ) and their perception on effects of climate change on cocoa production. The major constraints revealed were capital ( $x=37.360, p<0.05$ ), labour ( $x=54.087, p<0.05$ ). The study recommended that farmers should resupply old cocoa tree that is ageing, government should put up educational program tailored to meet climatic information for farmers, make funds available for farmers.

**Keywords:** Farmers' Perception, Effects. Climate Change, Cocoa Production.

## **INTRODUCTION**

Climate is the effect of weather over a long period of time usually twenty five years (Oluyole and Adebisi 2007).The major direct effects of climate change on agricultural production in Nigeria are through changes in temperature, precipitation, length of growing season and timing of extreme or critical threshold events. Climate change is the long term weather trend for the slow and gradual increase in the earth's temperature as a result of increasing greenhouse gases (/water vapour, carbon dioxide, methane and nitrous oxide).

Changes in the climate are likely to have a significant impact on agricultural production in some regions and big changes in cocoa production. Specifically, sensitivity of cocoa production to hours of sunshine, rainfall, soil conditions and temperature makes it vulnerable to climatic change. Climatic change can also alter the development of pests and diseases and modify the host's resistance (Anim-Kwapong and Frimpong, 2005).

Cocoa contributes significantly to economic growth and development in Nigeria through its sizeable foreign exchange earning that are incomparable to any other single agricultural export commodity,

significant farming come to peasant farmers, direct or indirect employment generation, and a vital source of raw materials for industrial production among others.

Obatolu *et al.* (2003) submitted that a number of factors have an interrelated impact on the growth of cocoa plant. These range from the weather elements of rainfall, temperature, sunlight and humidity to other factors such as soil nutrients status, pests, diseases, farming practices among others.

According to the inter-government panel of climate change (IPCC) assessment report (2007) eleven out of twelve years (1995-2006) show a global temperature that is among the warmest years since 1850. Climate change scenario for Africa suggests that food security and small holders incomes are severely threatened as growing seasons shorten and percent of arable lands decline. Projected reduction in yields in some countries could be as much as 50% by 2020 and crop revenues could fall by as much as 90% by 2100. (Boko *et al* 2007). Cocoa is a crop of the humid tropic and thus requires humid climatic conditions for good grow than the yield. Good cocoa production requires uniform distribution of rainfall throughout the year. According to ICCO (2009) they year to year variation in the yield of cocoa is normally affected more by the rainfall regime than by any other climatic variable.

In developing countries, climate change will cause yield declines for the most important crops, also it result in additional price increase for most important agricultural crops. Ojo and Sasiq (2010) noted that another danger to cocoa yield is prolonged dry season which encourages bush burning, while incessant rainfall for several weeks as it normally occurs in July and September easily lead to widespread of blackpod disease. This is very contagious and poses some challenges to farmers due to yield loss.

### **The Objectives of the Study**

The broad objective of this is to examine the Farmers Perception on Effects of Climate Change on Cocoa Production in Ibarapa/Ibadan Agricultural Zone of Oyo State, Nigeria

The specific objectives are to:

- (i) identify the selected personal characteristics of cocoa farmers
- (ii) ascertain the perception of cocoa farmers to climate change.
- (iii) identify the constraints facing cocoa farmers in the study area.
- (iv) determine the adaptation strategies used by farmers towards climate change.

## **RESEARCH METHODOLOGY**

### **The Study Area**

The study was conducted in Ibadan /Ibarapa agricultural zone of Oyo state which is one of the four administrative zones of Oyo state Agricultural Development Programme. The zone is made up of nine local government areas, each local government are a representative of extension block of OYSADEP. Oyo State is located in the South West region of Nigeria (Latitude 8° and Longitude 4°. East) bisect the state into four nearly equal parts. The State is bounded in the South by Ogun State and in the North by Kwara State. To the West, it is bounded partly by Ondo State and partly by Benin Republic while in the East, it is bounded by Osun State.

Three vegetation regions are marked out in the State. These are Forest, Derived Savannah and Savannah regions. The forest region has a higher relative humidity and rainfall pattern that support tree crops cultivation while the derived Savannah region with low humidity and rainfall pattern support mainly arable crops such as maize, cowpea and sorghum. The main occupation of the inhabitants is farming and both men and women are involved. Arable crops cultivated in the zone include maize, melon, soybeans, cassava, cocoa, oil palm and cashew.

### **Sampling Procedure**

The population of this study consisted of cocoa farmers in selected blocks of Ibadan/ Ibarapa zone of Oyo State. Three multi stage random sampling techniques was used in selecting the number of respondents for this study. The total number of blocks available within the zone are nine (9), 30% of the block was selected making three (3) blocks, the selected blocks are Akinyele, OnaAra and Oluyole. Each block comprises of eight (8) cells, 25% of the cells were chosen leaving us with two (2) cells each in a block namely Moniya, Ojaye, Akinsola, Gbedin, OdoOna and Dada. The total number of cocoa farmers in the

selected cells amount to 242, 52% of the total number of cocoa farmers were selected which made a total of one hundred and twenty six (126) respondents which was used for the survey.

#### **Data Collection and Analysis**

Data were collected from the primary source (respondents) with the aid of a structured interview schedule consisting of both open and close ended questions. The data collected were analyzed with the aid of descriptive statistics such as frequency counts and percentages. Inferential statistics such as chi square was used to analyze the study hypotheses.

#### **Hypothesis of the Study**

The hypotheses were stated in the null form (H<sub>0</sub>).

H<sub>01</sub>: There is no significant relationship between socio economic characteristic of cocoa farmers and their perception on climate change.

H<sub>02</sub>: There is no significant relationship between constraints faced by cocoa farmers and their perception on climate change.

#### **RESULTS AND DISCUSSION**

Data in Table 1 shows that majority of cocoa farmers 39.7% are between 41\_50 years, this indicate that not many young people are into cocoa farming in the area since only 3.2% of the respondent are below age 31, this is in line with Adetunji et al (2007) and Gray (2001) that cocoa farmers in West African Countries are of average age of 50years. Also, 67.5% of respondents are male while 96.8% are married and this point to the fact that cocoa production is a major family supporting venture in the area.

In the same vein, majority of the respondents 46% had household members between 7 and 12, this tradition of keeping large household is a trademark of the rural farmers who believe that more family members means more helping hands on the farm. Also 54% of respondents have primary school education and these represents the majority, the level of education affects individual eagerness to learn about new things and to adopt them, consequently the educational status of people could have an influence on their willingness to learn about new things, this is in agreement with Alfred and Fagbenro (2007) who reported that level of education and experience are significantly related to their perception on the availability and affordability of information.

**Table 1. Distribution of Respondents by Socio –Economic Characteristics**

<b>Characteristics</b>	<b>Frequency</b>	<b>Percentage(%)</b>
<b><u>Age</u></b>		
Below 31 years	4	3.2
31-40 years	34	27.0
41-50 years	50	39.7
51-60years	20	15.9
Above 60 years	18	14.3
<b><u>Gender (sex)</u></b>		
Female	41	32.5
Male	85	67.5
<b><u>Marital Status</u></b>		
Single	4	3.2
Married	122	96.8
<b><u>Household Size</u></b>		
1-6 members	56	44.4
7-12 members	58	46.0
13-18 members	12	9.5
<b><u>Educational Level</u></b>		
No formal Education	16	12.7
Primary Education	68	54.0
Secondary Education	30	23.8
Tertiary Education	12	9.5

Source: Field Survey, 2019

Data in Table 2 shows that rainy weather conditions do not favour cocoa production. This has led to erosion of cocoa land as agreed to by 88.9% of the respondents, followed by increase infestation of diseases on cocoa plants and strong winds that usually damage cocoa stands as agreed to by 86.5% of respondents. A broad-spectrum trend in the farmers perception of the effects of changing climatic conditions in the area is that rainfall negatively affects cocoa production more that it does its price and sales. According to results, the perception of farmers is that other climatic conditions such as extreme high temperature, low humidity and strong winds have undesirable effects on cocoa production in the area. This shows that all cocoa production processes are directly or indirectly weather and climate dependent (Ozekale et al 2009). The perception of the farmers to the numerous effects that changes in climate is bringing to the production of cocoa in recent times would to a large extent determine how the farmers are able to understand and cope with the dynamism of the situation

**Note.** In Table 2

- A – Insufficient rainfall has increased my cocoa production over the year
- B- increased sunshine hours have increased my cocoa production
- C- production is increased during harmattan
- D-rainfall increase infestation of diseases on cocoa production
- E- climate change has reduced price of cocoa products
- F- humidity reduces the drying process of cocoa beans
- G- climate change has adverse effect on sales of cocoa production
- H- climate change gas reduced the market value of cocoa product
- I – high rainfall leads to erosion of cocoa land
- J- drought leads to bush burning causing reduction in cocoa production
- K- climate change has increased my cocoa production
- L- more money is spent on adaptation practices as a result of climate change
- M- late rainfall affects cocoa plant flowering

- N- establishment of cocoa plantation is very difficult because the climate cannot be predicted
- O- increased in temperature affects the growth of cocoa seedlings
- P- extreme temperature causes serious defoliation of cocoa tree
- Q- low humidity causes serious defoliation of cocoa tree
- R – strong wind usually damage my cocoa stands
- S- cocoa stands should be established where climatic factors can be controlled
- T – applied agrochemicals meant for effective growth and development of cocoa stand and pods are usually washed away by excessive rainfall

**Table 2: Farmer perception about climate change**

Farmer perception	Strongly disagreed	Disagreed	Undecided	Agreed	Strongly agreed	Mean	Standard deviation
A	45.2	38.1	0.0	10.3	6.3	1.944	1.202
B	0.0	22.2	7.1	19.8	50.8	3.992	1.217
C	3.2	6.3	0.0	17.5	73.0	4.501	1.010
D	0.0	7.1	3.2	3.2	86.5	4.691	0.843
E	6.3	30.2	19.0	36.5	7.9	3.100	1.113
F	1.6	6.3	0.0	3.2	88.9	4.714	0.884
G	0.0	19.8	19.0	46.8	14.3	3.556	0.968
H	12.6	52.4	11.9	19.8	3.2	2.421	1.162
I	0.0	0.0	0.0	11.1	88.9	4.698	1.083
J	0.0	7.9	0.0	10.3	81.7	4.532	1.276
K	6.4	3.2	3.2	75.4	11.9	3.802	1.020
L	0.0	29.4	30.2	16.7	23.8	3.286	1.264
M	0.0	13.5	0.0	3.2	83.3	4.500	1.231
N	0.0	40.5	0.0	16.7	42.9	2.960	1.046
O	0.0	13.5	0.0	11.1	75.4	4.421	1.229
P	0.0	13.2	0.0	21.4	65.1	4.318	1.218
Q	0.0	3.2	0.0	50.0	46.8	4.405	0.659
R	0.0	10.3	0.0	3.2	86.5	4.659	0.922
S	0.0	10.3	4.0	57.9	27.8	4.032	0.857
T	57.9	0.6	0.0	31.7	10.3	1.730	1.203

Source: Field Survey, 2019

Table 3 shows constraints facing cocoa farmers and it was revealed that lack of capital to invest in cocoa production was the most felt constraint to cocoa farmers. In practicing agriculture, it is noted that capital is an impending issue and it also determines the production capacity of farmers. Other constraints that had grave adverse effects on cocoa farming include lack of improved cocoa varieties, high cost of transportation, high labour cost. The least felt constraint was lack of proper storage systems for cocoa. This may be so because cocoa farmers have over the years and by their accumulated years of experience in the occupation have been able to develop efficient storage methods for cocoa seeds.

**Table 3: Constraints of Cocoa Production**

Constraints	Percentage (%)		Respond
	No Constraint	Minor Constraint	
Lack of capital	3.2	10.3	86.5
High labour cost	13.5	15.9	70.6
High weed rate	30.2	21.4	48.4
High pest infestation	7.1	22.2	70.6
Disease infestation	10.3	27.0	62.7
Inadequate market	32.5	34.1	33.3
Lack of proper storage system	96.8	3.2	0.0
Inadequate agrochemicals	40.5	57.9	1.6
High cost of transportation	13.5	9.5	77.0
Lack of improved varieties	10.3	6.3	83.3
Inaccessibility of cocoa farms	19.8	44.4	35.7
Lack of adequate farmland	90.5	3.2	6.3
Improper policy implementation	43.7	53.9	3.2
Pilferage of cocoa pods	71.4	15.9	12.7

Source: Field Survey, 2019

Table 4 show the various adaptation strategies used by cocoa farmers towards climate change and it was revealed that spraying (mean score =1.73) was the most adapted strategy used to ameliorate the effects of climate change on cocoa. This was followed by early planting of cocoa trees (mean score=1.14). Cocoa farmers also use manure fertilizer in order to boost the growth rate of seedlings and make it resistant to climate changes. Spacing is a very important adaptative strategy used by farmers as Winchesth and Scalachman (2009) agreed that good health could improve adaptative capacity to climate change.

**Table 4: Various adaptation Strategies used by Cocoa farmers towards Climate Change**

Adaptation Strategies	Percentage response			Mean
	Not used at all	Slightly used	Strongly used	
Soil conversation	41(32.5)	41(32.5)	44(34.9)	1.02
Planting of trees	52(41.3)	49(38.9)	25(19.8)	0.79
Planting of different varieties	95(75.4)	17(13.5)	14(11.1)	0.36
Early planting	24(19.0)	60(47.6)	42(33.3)	1.14
Late planting	96(76.2)	17(13.5)	13(10.3)	0.34
Irrigation	73(57.9)	29(23.0)	24(19.0)	0.61
Fertilizer application	67(53.2)	13(10.3)	46(36.5)	0.83
Manure application	57(45.2)	69(54.8)	0(0.0)	0.55
Spraying	13(10.3)	8(6.3)	105(83.3)	1.73

Source: Field Survey, 2019

### Test of hypothesis

#### Hypotheses I

Chi square analysis was used to test the relationship between socio economic characteristics of cocoa farmers and their perception on effects of climate change on cocoa production. Results showed that age, sex, marital status and household size ( $\chi^2 = 68.239, 40.245, 35.909, 93.549, P < 0.005$  respectively) of the respondents were statistically significant. This implies that gender is an important consistuent of sustainable agricultural development as both male and female are key players and it is in line with Abdullahi, Suleiman, Miko and Ismail (2012) assertions. Household size is of great important as they

serve as source of labour on the farm. The results showed that there is significant relationship between socio economic characteristics of cocoa farmers and their perception on effects of climate change on cocoa production.

### **Hypotheses II.**

Chi square analysis was used to test for the relationship between constraints faced by cocoa farmers and their perception on effects of climate change and it was revealed that capital, labour, weed ( $X_2 = 37.360, 54.087, 28.584, p < 0.005$ ) are statistically significant which implies that there is significant relationship between constraints faced by cocoa farmers and their perception on climate change.

### **CONCLUSION AND RECOMMENDATIONS**

Based on the findings of this study, it can be concluded that rainfall and other climatic conditions such as extreme high temperature, low humidity and strong winds have undesirable effects on cocoa production at the seedling stage, fruiting stage and ripening stage. The development of diseases, pests and weeds that interfere in the production of cocoa affect its production. The study established that all cocoa farmers irrespective of their socio economic characteristics are aware about climate change and its multitudinal effects on their farming activities. Climate change poses serious problem to cocoa agriculture in Nigeria. Adequate efforts by the government to address this issue are required in order to address present and future income losses from the problem as most farmers revealed that they had little or no access to extension information on climate change. It is therefore recommended that as follows.

- (i) The study also revealed that spraying cocoa trees against cocoa black pod disease are important as way of coping with climate change. Government and extension agents should improve their efforts in disseminating extension information on climate changes to farmers in all rural areas.
- (ii) The youth should be encouraged to participate in cocoa production. Cocoa production should be taken to next level of cultivation by planting hybrids of different varieties, use of insecticides to control outbreak of infestation of pest, replanting of old cocoa trees by the farmers.
- (iii) Government and stakeholders should put up educational programmes tailored to meet the climatic information needs of farmers to enable them cope with the emerging challenges to enhance their production.

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