

## PERCEPTION AND IMPACT OF CLIMATIC VARIATIONS ON CROP PRODUCTION IN SAPELE LOCAL GOVERNMENT AREA OF DELTA STATE, NIGERIA

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### Abstract

*The study examined the perception and impact of climatic variations and associated extreme events such as flood, storms and wind on crop production in Sapele Local Government Area of Delta State, Nigeria. One hundred and twenty farmers randomly selected from twelve villages in the Local Government Area were used to constitute the sample. A structured questionnaire was used to collect the data. The data was analyzed using frequency counts and percentages. The study indicated that the major climatic problems are water related – floods (88.3%), windy rains (86.7%) and heavy rainfalls (90.0%). The study showed that root and tuber crops (cassava, yam, and cocoyam) are mostly affected by the climate problems. Finally the farmers do not know that human activities can contribute to the problems and also the role of man in alleviating these challenges.*

**Keywords:** Floods, storms, crop production.

### Introduction

Man depends directly or indirectly on crops for his food, clothing, shelter and drugs. Population increase leads to pressure on the available land such that land available to individual farmers continues to diminish in size and productivity.

Crop production in the past was carried out on a small scale which could be referred to as subsistence agriculture. The peasant farmer possesses small scattered pieces of land. This type of agriculture is characterized by the use of crude farm implements, use of family labour, the products from the farmer are usually meant for family consumption and the left over are sold for cash. The peasant farmers contribute a greater proportion of the food consumed in most agrarian economies like Nigeria. Subsistence farming has low input-output ratio.

Crop production in recent times has taken a new dimension. It is carried out on a large

scale often regarded as commercial agriculture. It is characterized by the use of large farm holdings, it is capital intensive, it is market oriented and there is high input-output ratio. Commercial agriculture is also characterized by the use of modern farm machineries such as tractors, ridger, planter, harvester etc and modern farm inputs such as herbicides, insecticides, and pesticides. The use of these farm machines and farm inputs has adverse effect on climate as it leads to the emission of toxic gases and chemicals into the atmosphere. Land use change and fossil fuel have increased the emission of carbon dioxide and other greenhouse gases into the atmosphere at regional and global scales (Janzen, 2004).

According to the intergovernmental panel on climate change (IPCC, 2007) food production may benefit from a warmer climate, the increased potential for drought, floods and heat waves, will pose challenges for farmers

### Statement of problem

Climate variation refers to a change in climatic conditions that is attributable directly or indirectly to natural or human causes. The natural causes are volcanic eruptions, ocean current, and earth orbital changes and solar variations the human causes are carbon emissions from livestock's and manure, carbon emission from transport, use of fuel to generate energy and energy use in the home.

The challenges pose by climatic variations on crop production has been well documented. Olesen and Bindi (2002) reported that climate change will likely lead to a major spatial shift and extension of crop lands as it will create a favourable or restricted environment for crop growth across different regions. Studies indicate that frequency of heat stress; drought and flood negatively affect crop production (Olaniran, 1991, Onyekwelu et al, 2006 and Omotosho and Abiodun, 2007).

IPCC (2007) assessment reports predicted increased evapotranspiration and lower soil moisture levels in drier areas as a result, some cultivated areas may become increasingly arid.

Several factors that directly connect climate change and agricultural productivity include; average temperature increase, change in rainfall amount and patterns, rising atmospheric concentrations of CO<sub>2</sub> pollution levels and climatic variability with associated extreme events such as drought, flood and storms. All these impact negatively on crop production and agricultural activities.

The general objective of the study is to examine the perception and impact of climatic variations and associated extreme events such as flood and storms on crop production in Sapele Local Government Area of Delta State.

Specially, the study intends to:

- i. Identify socio-economic characteristics of respondents
- ii. Examine the climatic problems facing the respondents
- iii. Examine how much of the farmland is affected by the climatic problems
- iv. Identify the major crops affected by the climatic problem

### Methodology

The study area is Sapele Local Government Area of Delta State, Nigeria. Sapele Local Government Area is one of the twenty – five LGA's in Delta State. The Local Government Area is made up of four major farming clans' Amukpe, Elume, Okokporo and Ugborhen. Each of the clan is made up of more than ten communities (villages). The communities has tropical climate with temperature range of 25<sup>0</sup> to 34<sup>0</sup>C and a rainfall between 2500mm – 3000mm per annum which is distributed for about 9 months stretching from March – November.

The occupation in the study area is farming although is a largely traditional and substance in nature. The major crops grown are cassava, yam, maize, okro, cowpea, pepper tomato. Plantation crops such as rubber, plantain, oil palm, banana and citrus, are also grown. In addition trading and craftsmanship are the non-agricultural activities prevalent in the area. Four communities were randomly selected from each of the four clans; this made a total of 12 villages. Ten farmers were randomly selected for interview through simple random sampling technique giving a total of 120 respondents for the study.

The ten (10) respondents represented about 20% of the potential farming families in each village. A structured interview schedule was used to collect data from the respondents. The study was carried out between June and August, 2010. The interview schedule elicited information on general questions relating to

the former socio-economic status, and specific questions on climatic variations and its attendant consequences. The researcher interviewed one person performing family. If the husband and wife are present the researcher interview one of them, usually the wife. This is because the woman plays major role in crop farming in the area. The period of the study coincided with the peak of the vain and so the researcher had a first hand information on impact of floods.

The farm size or land size was estimated from the local plot (Ovwerotore) four plots (Ovwerotore) is equivalent to one hectare of farm land especially for the food crops and vegetables.

## **Results and discussion**

### **Socio-economic characteristics**

The socio-economic characteristics of the respondents are presented in table 1. The findings in table 1 indicated 42.5% of the farmers are male while 57.2% are females.

In regards to age, most of the respondents are in the age bracket of 41 – 50 years representing 37.5% are the majority. This is closely followed by those in the age bracket of 31 – 40years representing 25.0%. Those in the age bracket of 21 – 30 years, 51 – 60years and 61 years and above represent 21.7%, 12.5% and 3.3% respectively. On the issue of marital status 75.0% of the respondents are married while 16.7% are single and 8.3% divorced. The above showed that majority of the respondents are married. The educational statuses of the respondents showed that 50.0% had primary education closely followed are those with no formal education 29.2%. Those with modern/secondary education accounted for 16.7% of the respondents while tertiary education is 4.1%. The above showed that

most of the respondents have primary education. The analysis also showed that the occupational status of respondents with 70.0% as farmers, 25.0% as traders and the remaining 5.0% as civil servants.

### **Climatic problem faced by farmers**

The data in table 3 (appendix) showed the distribution of respondents by climatic problems encountered. An 88.3% each of the respondents faced problem of flooding of farmlands annually. About 86 percent faced the problem of windy rains and 90 percent faced the problem of heavy rainfalls. The data also showed that the farmers faced the problem of higher sunshine. The analysis showed that the major climatic problem encountered in the area is water related. The area is generally a low land and most of the farm lands are surrounded by streams and rivers. This finding agrees with the findings of IPCC (2007) which observed that increased potential for flood, drought and heat waves will pose challenges for farmers. The respondents noted that the greatest challenge of the climatic variation is the unpredictability of the weather. They observed that planting early does not help in to overcome the annual flood as the rains often starts when least expected.

### **Impact of the climatic variations**

It is evident from the data shown in table 3 and 4 that the farmers are severally affected by the climatic variations. Table 3 shows that 66.7% and 31.7% of the respondents lose between 0 – 1 ha and 1.1 – 2.0 ha of land to climatic related problems especially floods. This according to the respondents is between 30 – 50% of the farm lands as most of the farmers cultivate between 3 to 5 hectares (locally 12 – 20 ovwerotores).

Table 4 shows the crops mostly affected by the climatic problems are the root and tuber crops 81.7% while the grains and tree crops

accounted for 10.0% and 8.3% respectively. The analysis showed that root and tuber crops are mostly affected. This is because they mature late. Studies by Olaniran (1991), Onyekwelu, et al, 2006 and Omotosho and Abiodun (2007) indicated that frequency of heat stress, drought and flood negatively affect crop production.

The study also showed that the farmers have deep understanding of the consequences of climatic variations and associated extreme events such as flood and storms on crop production. The farmers also understood that their farm terrain is highly vulnerable to these climatic related problems. They do not however, understand that human activities can contribute to these events and also their role in helping to alleviate the problem. Finally the farmers have no scientific knowledge or information on weather and extension services do not exist and where they are present they have nothing to offer on climatic challenges.

**Conclusion**

Agriculture and particularly crop production is highly sensitive to climate variability and weather extremes such as floods and several storms. Specially, the study revealed the major

climatic problems encountered by the farmers in the Local Government Area are water related – flooding of farmlands, windy rains, and heavy rainfalls. The farmers in the area are major small holder farmer who cultivate between 1-3ha of farmlands to food crops. The farmers do not understand that human being can contribute to climatic related problems and also help to alleviate the problem. There is no information on weather and climatic data at the disposal of the farmers.

**Recommendations**

1. The government should carryout awareness campaign on climatic variations and it attendant consequences.
2. Government should over land the extension service system as their activities is not felt in the rural areas.
3. Extension education should include climatic related services.
4. There should be assistance given to farmers who are affected by floods especially through the local authorities
5. Government should encourage measures aimed at improving our climatic conditions.

**Appendix**

Table 1: Distribution of respondents according to their socio-economic characteristics

Characteristics	Frequency	Percentage
Sex	51	42.5
Male	69	57.5
Total	120	100
Age (Years)		
21 – 30	26	21.7
31 – 40	30	25.0
41 – 50	45	37.0
51 – 60	15	12.5
61 – above	4	3.3
Total	120	100
Marital Status		

Marital status		
Single	20	16.7
Married	90	75.0
Divorced	10	8.3
Total	120	100
Educational Status		
No formal education	35	29.2
Primary education	60	50.0
Modern/secondary school	20	16.7
Tertiary education	5	4.1
Total	120	100
Occupation		
Farming	84	70.0
Trading	30	25.0
Civil servant	6	5.0
Total	120	100

Source: Field Survey, 2010.

Table 2: Distribution of respondents according to the climatic problem faced by farmer

Climatic Problem	No. of Respondents	Percentage
Heavy rainfalls	108	90.0
Flooding of farm lands	106	88.3
Wind and storms	104	86.7
Higher sunshine	70	58.3
Long period of dry seasons	-	-
Prolong harmattan	-	-
Inadequate rains	-	-

Multiple Responses

Source: Field Survey, 2010

Table 3: Estimate of farm lands affected by climatic problems annually

Land Size (ha)	Frequency	Percentage
0 – 100	80	66.7
1.1 – 2.0	38	31.7
2.1 – 3.0	2	1.6
3.1 – 4.0	-	-
4.1 and above	-	-
Total	120	100

Source: Field Survey, 2010.

Table 4: Frequency distribution of respondents according to the crop affected by climatic problem

Crop Type	No. of Respondents	Percentage
Root crops (cassava, yam cocoyam)	98	81.7
Grains (maize, cowpea)	12	10.0
Tree crop (rubber oil palm)	10	8.3
Vegetable (okro, tomato)	-	-
Total	120	100

Source: Field Survey, 2010.

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