

Economic implications of climate change effects and awareness level among arable crops farmers in south-south, Nigeria

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Abstract

The foremost aim of the survey is to determine the economic implication of climatic effects and awareness level among respondents. Multi-stage procedure of sampling was adopted in assortment of the study sample. Studied data were attained with the aid of designed questionnaires and analysed using descriptive statistics. Respondent were matured with average age of 49 years with low educational level of primary school who were mostly married female gender. The study observed moderate family size of 9 persons having 19 years farming experience undergoing full-time arable crop farming and respondents mostly grown cassava, cocoyam, yam and maize. Climate agent affected respondents negatively leading to loss of arable crops output and annual income. Respondents were aware of climatic factors but attributed it to natural disaster and punishment from their gods. Climate change awareness level was low as most respondents does not believe that climate change exist. This is of serious concern to climate change scholars in bridging the awareness gap level in our society especially in the rural areas and Government and NGOs should provide short term relief and credits to respondents. It further recommends awareness of climate change campaign in the rural communities.

Keywords: Arable Crops; Awareness; Climate Change; Economic; Farmers; Level

1. Introduction

In Nigeria, agricultural production is heavily dependent on environmental factors like temperature, rainfall and relative humidity [7]. Agricultural production involves a livestock, forestry, fishing and production of cash crops and arable crops such as cassava, yam, cocoa, maize, oil palm and groundnut due to abundant human and land supply in Nigeria [1].

Climate change has been defined as change in weather for at least over a period of 35 years [10]. Climate change is mostly caused by human activities such as burning of fossil fuel, indiscriminate bush burning deforestation that increase the carbon dioxide in the atmosphere.

The major obstacle to food production is climate change as many developing country of the world depends on labour-intensity and rain fed Agricultural production [6], [9]. Access to food and agricultural production will be severely compromised in the face of climate change [9].

Climate change affect adversely socio-economic sectors such as agriculture, food security, resources, forestry, human health, water and fisheries especially developing nations that are most vulnerable [8].

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The research tends to address the research gap if climate change awareness level among arable crop farmers in South-South Nigeria as climate change awareness campaign mechanism were lacking coupled with insufficient literature. Hence this research addressed the following objectives.

Aim

Determine the socioeconomic characteristics of respondents

- Ascertain climatic agents affecting respondents
- Analyze climatic impacts level of losses
- Determine the effects of climatic change on respondents
- Estimate annual income losses
- Determine perception of awareness level of climate change among respondents

2. Material and methods

The South-South Nigeria was chosen for the study as most inhabitants are farmers that most grown arable crops alongside fishing, livestock and petty marketing engagement. The region area has a population of about 6 million persons with diverse ethnic nationalities [12]. The South-South Nigeria is made up of six states namely, Edo, Delta, Bayelsa, Rivers, Cross Rivers and Akwa Ibom. Multi-stage procedure of sampling was embraced for the study. Firstly, three states were nominated randomly. Secondly, four local government areas (LGAs) each were nominated randomly amounting to 12 LGAs. Thirdly, four rural communities each were selected randomly giving a overall of 48 communities and lastly six farmers each were carefully chosen from the 48 communities giving a aggregate of 288 farmers utilized. Studied data were achieved with the aid of controlled questionnaires directed to respondents. Data were examined by descriptive statistics such as mode, mean, median, frequency and percentages.

3. Results and discussion

3.1. Socioeconomic characteristics of arable farmers

The respondents were within the age bracket of 49 – 61 years with a mean age of 49 years reveals that respondents were matured. Also female gender of 65.6% and low educational level of primary school who were mostly married 64.6% engaged in food crop farming. Mean family size of 9 persons having 19 years farming experiences undergoing full time farming were witnessed as shown in Table 1. This work conformed to the report of [3] and [6] that most farmers were married with low educational level. Also [14] stated that most farm participants were married, average family size and with farm experience.

Table 1 Socio-economic characteristics of Arable farmer

Variables	Frequency	Percentage (%)	Mean/Mode
Age (years)			
23 – 35	39	13.5	49 years
36 – 48	90	31.3	
49 – 61	115	39.9	
62 – 74	44	15.3	
Gender			
Male	99	34.4	Female
Female	189	65.6	
Marital Status			
Single	28	9.7	Married
Married	186	64.6	

Widow	74	25.7	
Educational level			
Primary school	116	40.3	Primary school
Secondary school	104	36.1	
Tertiary education	68	23.6	
Family size (persons)			
1 - 4	41	14.3	9 persons
5 - 8	83	28.8	
9 -12	121	42.0	
13 - 16	43	14.9	
Farming Nature			
Full time	252	87.5	Full time
Part time	36	12.5	
Farming Experience (years)			
1 - 9	51	17.7	19 years
10 - 18	83	28.8	
19 - 27	98	34.0	
28 - 36	56	19.5	
Annual Income (₦)			
65,000 - 84,000	42	14.6	₦112,625
85,000 - 104,000	60	20.8	
105,000 - 124,000	88	30.6	
125,000 - 144,000	79	27.4	
145,000 - 164,000	19	06.6	

Source: Field data

3.2. Arable crop enterprise of rural households

Most produces grown were cassava 35.4%, yam 24.5%, cocoyam 09.2% and maize 30.9%. Most respondents engaged in cassava production as shown in Table 2. This report is backed up by [5] that farmers mostly derived their income from crops in Delta. Also [2] reported that many arable crops farmers engaged in organic manure usage in Isoko North Local Government Area.

Table 2 Arable crop enterprise of rural households

Crops	Frequency (n=288)	Percentage (%)	Mode
Cassava	280	35.4	Cassava
Yam	194	24.5	
Cocoyam	73	9.2	
Maize	245	30.9	

Source: Field data; Multiple responses observed

3.3. Climatic agents affecting arable crop production

Climatic agents affected food crop production negatively were deforestation 10.7%, erosion 10.5%, overgrazing 9.7%, flooding 14.2%, water pollution 9.5%, indiscriminate bush burning 10.6%, air pollution 10.8%, continuous cropping 13.8%, industrialization 8.9% and afforestation 1.1% as shown in Table 3. The climate change agent flooding posed a serious problem to arable crop farming followed by continuous cropping which led to soil nutrient depletion s reported by [13].

Table 3 Climatic Agents affecting arable crop production

Climatic Agent	Frequency (n=288)	Percentage (%)	Mode
Deforestation	203	10.7	Flooding
Erosion	199	10.5	
Overgrazing	184	9.7	
Flooding	269	14.2	
Water pollution	180	9.5	
Indiscriminate bush burning	200	10.6	
Air pollution	205	10.8	
Continuous cropping	261	13.8	
Industrialization	169	8.9	
Afforestation	20	1.1	

Source: Field data; Multiple responses observed

3.4. Arable crop farmers' perception to climate change factors

The rural households engaging in arable crop production perception to climate change factors were well-defined. Climate change factors such as temperature, excessive heat, excessive lightning/storm, excessive flooding, seasonal variation, prevalence of diseases, sickness and change in rainfall pattern were increasing while arable crop output and drought were decreasing as shown in Table 4. These trend of decreasing in arable crop output with increasing climate change factors as stated above could lead to food shortage and insecurity in the area of study. Most respondents attributed it to punishment from their gods and natural cause. This collaborated the work of [11] that "Farmers perception to climate change were greatly influenced by their social and economic status..."

Table 4A Awareness level perception of climate change factors

Climate change factors	Increasing	Decreasing	Remark
Temperature increase	243 (84.4%)	45 (15.0%)	Increasing
Excessive heat	269 (93.4%)	19 (6.6%)	Increasing
Excessive lightning/storm	261 (90.6%)	27 (9.4%)	Increasing
Excessive flooding	242 (84.0%)	46 (16.0%)	Increasing
Drought	42 (14.6%)	246 (85.4%)	Decreasing
Seasonal variation	193 (67.0%)	95 (33.0%)	Increasing
Agricultural output	10 (3.5%)	278 (96.5%)	Decreasing
Prevalence of diseases	201 (69.8%)	87 (30.2%)	Increasing
Sickness	183 (63.5%)	105 (36.5%)	Increasing
Change in rainfall pattern	216 (75.0%)	72 (25.0%)	Increasing

Source: Field data

3.5. Perception to climate change awareness

The perception to climate change awareness in the South-South Nigeria was low 59.4% as many respondents claimed that increase in climate change factors like increase in temperature, flooding, excessive, prevalence of diseases, sickness among others were punishment from gods from their believe. These trend is not alright considering climate change impact on food production and livelihoods. This agreed with [4] that most respondents lack climate change awareness due to illiteracy and extension agent exposure.

Table 4B Perception to Climate Change awareness

Causes	Frequency (n=288)	Percentage (%)	Mode
Climate change	23	8.0	Gods punishment
Gods punishment	171	59.4	
Natural occurrence	94	32.6	

Source: Field data

3.6. Estimated annual income losses (Naira)

The respondents revealed that estimated annual income losses ranges between ₦65,000 – ₦84,000 with a mean of ₦74,847 (\$176.40) as shown in Table 5. This losses as a result of climate change impact on arable crop farmers was substantial as compared to their mean annual income of ₦112,625 (\$265.43) which was about 66.50% losses. This may account for incidence of poverty in the areas per capita income is less than a dollar a day (\$10.73).

Table 5 Estimated annual income losses (Naira)

Estimated losses (N)	Frequency (n=288)	Percentage (%)	Mode
25,000 – 44,000	14	4.9	N74,847
45,000 – 64,000	58	20.1	
65,000 – 84,000	125	43.4	
85,000 – 104,000	91	31.6	

Source: Field data

3.7. Climate change effects on Arable crop output

The perception of arable crop farmers on cassava output, yam output, cocoyam output and maize output were on the decreasing trend due to climatic adverse effects on arable crop production as shown in Table 6. These scenario of adverse effects of climate change on arable crop production could lead to hunger and food insecurity in the rural households. This is in agreement with [4] that climate change socioeconomic effects on rural farmers were enormous and hazardous in Delta State.

Table 6 Climate change effects on Arable crop output

Arable crop output (kg)	Increasing	Decreasing	Remark
Cassava	26 (9.0%)	262 (91.0%)	Decreasing
Yam	68 (23.6%)	220 (76.4%)	Decreasing
Cocoyam	95 (33.0%)	193 (67.0%)	Decreasing
Maize	44 (15.3%)	244 (84.7%)	Decreasing

Source: Field data

3.8. Climate change impacts level of losses

The impact level of losses were no impact level 28%, moderate impact level 20.8%, severe impact level 44.1% and very severe impact level 32.3% as shown in Table 7. Ranking the impact level most respondents stated that the impact level were severe which might be due to annual income losses and decrease in arable crop output.

Table 7 Climate change impacts level of losses

Losses impact level	Frequency (n=288)	Percentage (%)	Mode
No impact	08	2.8	Severe impact
Moderate impact	60	20.8	
Severe impact	127	44.1	
Very severe impact	93	32.3	

Source: Field data

4. Conclusion

Most arable crop farmers were matured with a mean age of 49 years with low educational level of primary school who were mostly married female gender. It was observed that moderate family size of 9 persons having 19 years farming experiences undergoing full time arable crop farming. Most crop grown were cassava, yam, cocoyam and maize. Climatic agents affected arable crop farmers negatively leading to lose of arable crop output and annual income. Respondents were aware of climate change factors but attributed it to natural disaster and punishment from their gods. Climate change awareness level was low as most respondents does not believe that climate change exist. This is serious concern to climate change scholars in bridging the awareness gap level in our society especially the rural households. The study recommends that Government and NGOs should provide short term relief and credits to arable crop farmers. It further recommends awareness climate change campaign in the rural communities.

Compliance with ethical standards

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Disclosure of conflict of interest

There is no conflict of interest.

Statement of informed consent

Informed consent was obtained from all respondents in the study area.

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