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# INDIGENOUS METHODS OF ADAPTING TO CLIMATE CHANGE IMPACT AMONG CASSAVA FARMERS IN AKWA IBOM STATE, NIGERIA

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## ABSTRACT

*The study assessed the indigenous adaptation methods to climate change impact among cassava farmers in Akwa Ibom State, Nigeria. Primary data were collected with a structured questionnaire and recorded responses during focus group discussions. A sample size of 180 farmers were randomly selected for the study. Data were analysed using descriptive statistics. Findings revealed that 53.3% of the respondents were male while 46.7% were female. A large proportion (59.4%) of the respondents were within the age range of 40 -50 years. The mean age was 40 years. A total of 15 practices were known to cassava farmers, however, only ten (10) variables were highly practiced. These included mulching ($\bar{x}$ = 3.822), organic manure ($\bar{x}$ = 3.817), mixed cropping and cover cropping ($\bar{x}$ = 3.878), early maturing varieties ($\bar{x}$ = 3.839), Improved varieties ($\bar{x}$ = 3850), relay cropping ($\bar{x}$ 3.678), total dependence on rain ($\bar{x}$ = 3.656), early planting ($\bar{x}$ 3.061), pests and diseases resistant varieties ($\bar{x}$ = 3.706) changes in planting ($\bar{x}$ = 3.561. The result of the hypothesis revealed that the mean difference was statistically significant at a 5.0% level of probability. The study therefore recommends more robust collaboration among cassava farmers and stakeholders for evolving innovative approaches and adaptive measures for the climate change phenomenon in the State.*

**Keywords**: Indigenous methods, Climate change, Cassava farmers

## INTRODUCTION

In Nigeria, cassava is a major cash crop (Maduawuchi 2020). The crop is planted by stem and usually planted in level land, ridges or molds. Cassava production and consumption globally have revealed how cassava is valued as one of the most important food crops (Viduranga, 2018).

Cassava is one of the important staple food crops that is grown throughout the tropics and consumed by almost every household and is often intercropped with other crops Udousung *et al*, (2018). Nigeria is regarded as the world's largest producer of cassava with about 20.4 % of the world's exports in year 2017 (Otekunrin and Sawicka, 2019). The production of cassava is concentrated in the hands of numerous smallholder farmers located primarily in the South and central regions of Nigeria (Ojimba 2017). About 31.8 million tonnes are produced annually with internal demand of 48 million tonnes.

The unsteady pattern of climatic components has been observed, and these changes in climate has resulted to the destroying impacts on cassava cultivation over different parts of the nation. The impact of climate change on agriculture are different and depending on numerous variables such as time, area, and response strategies (mitigation and adaptation), that are put in place. Climate changes can result in lower crop yield and nutritional quality due to drought, heat waves, and flooding as well as an increase in pests and diseases, making it difficult for agricultural activities to meet human needs (Kerr *et al.,* 2022). They also noted that changes in carbohydrate status of the plant can happen as well. The progressing exposure to climate change is to a large extent due to weak regulatory capacity, little research on adaptation strategies, and a need for the appraisal of local ideas (Bausch & Koziol, 2020; Bezner (2022) noted that the indirect impacts of climate change on agriculture include, effects on pest and diseases as well as the impact of these on agricultural production. Increment within the recurrence of extreme events such as extended dry seasons or serious flood cases makes conditions that cannot be conducive to pest and disease outbreaks and badly disturb the predator-prey relationship that could limit the infestation of pests. The effect of these scenarios on the attainment of the Sustainable Development Goals (SDGs) is clear, particularly in developing nations like Nigeria. The detrimental impacts of climate change will be enormous in developing countries, especially tropical regions (Malhi *et al.*, 2021) Climate change is quickly becoming the most vital natural challenge confronting mankind, climate alteration is anticipated to show an expanded chance of risk, new levels of dangers and possibly harmful impacts, especially in Akwa Ibom due to its dependence on rain-fed agriculture (Ekpo and Nzegblue 2014).

An emphasis on “Climate change adaptation” is necessary, and it means the action taken that reduces the negative impact of climate change while taking advantage of potential new opportunities (Government of Canada 2015).

As a response, local farmers have developed means of coping with the challenges of climate change, using their indigenous methods. Indigenous knowledge of climate adaptation is a feasible option for cost-effective and sustainable development, particularly in Africa where there is a need to conserve natural resources such as water in the face of climate fluctuations (Thakur *et al.*, 2020). Ajani *et al*., (2013) stated that the importance of indigenous knowledge has been realized in the design and implementation of sustainable development projects. Farmers in sub-Saharan Africa have developed several coping measures that have enabled them to reduce vulnerability to climatic fluctuations and extremes. One important step in reducing the vulnerability of a climatic hazard is the development of an early warning system for the prediction or forecast of the event. Local farmers in Nigeria have been known to conserve carbon in soils through the use of zero-tilling practices in cultivation, mulching, and other soil management techniques. The climatic variabilities are usually controlled in ways that allow the

small farming households to meet their subsistence desires using the available means without depending a great deal on modern agricultural technologies.

## METHODOLOGY

### The Study Area

The study was carried out in Akwa Ibom State, which formed a part of the core States in the "oil palm belt" of the Niger Delta region of Nigeria. It has an estimated total population of 3,920,203 people (NPC, 2006). The predominant occupation of the people is farming where the major land use pattern is rain-fed tree and food crop production, including oil palm and livestock rearing, while fishing is conducted in the riverine areas of the State.

### Sampling Procedure and Data Collection

The study population was cassava farmers, drawn from the selected Agricultural zones in Akwa Ibom state. A multi-stage sampling technique was adopted in the selection of respondents. In the first stage, three (3) Agricultural zones were selected purposively out of the six agricultural zones in the State. This was done, using the purposive sampling technique from the data that was gotten from Akwa Ibom State Agricultural Development Programme (AKADEP), which had the predominant cassava production records. At stage two, two blocks were selected from each of the zones, and at stage three, three (3) cells/ villages were selected from each of the blocks, making a total of 18 villages. Ten respondents were selected from each village making a total of 180 respondents. Primary data used for the study were collected using a well-structured questionnaire.

To measure respondents' utilization pattern of indigenous climate change strategies,15 practices were presented. A four-point Likert-type scale of - always utilized (4), mostly utilized (3) occasionally utilized (2), and not utilized (1). Respondents with mean scores of 2.5 and above were judged to have utilized, while mean scores below 2.5 were adjudged not to have utilized.

## RESULTS AND DISCUSSION

The socio-economic characteristics of cassava farmers in Akwa Ibom State are presented in Table 1, revealing that 53.3% of the respondents were male while 46.7% were female. The mean age for the farmers in the study area was 40 years.

Marital status indicated that majority of the respondents (63.9%) were married. This may be as a result of high labour requirements in agricultural production in which family labour is highly employed and partly due to the expected benefits derived from feeding members of their family from what they produce. Regarding education, 98.9% of the respondents had acquired formal Education, 17.2% had tertiary education, 56.7% had secondary education, 25.0% of the respondents had primary education and 1.1% had no formal education. This suggested that cassava farming activities in Akwa Ibom State were handled by enlightened persons. A majority (67.8%) of the respondents earned between ₦11,000 – ₦30,000 per month, followed by 21.7% whose income range was ₦31,000 – ₦50,000. About 6.7% had an income range of ₦51,000–₦70,000 and only 1.7% of the cassava farmers had ₦91,000 – ₦110,000. The mean farm income for the cassava farmers was ₦13,202.76. The result of the analysis showed that a higher proportion (59.4%) of the respondents had farming experience range of 6-10 years, 20.6% had 11-15 years, 13.3 had over 15 years and only 6.7% had 1-5 years. Table 1 showed that a greater proportion (83.3%) of the respondents had no contact with an extension agent over the years A greater proportion (80.6%) of the respondents did not have access to credit facility. This result collaborates with Umoren *et al*., (2014) who found out that most farmers including cassava farmers in the State had very poor access to credit facilities.

**Table 1: Socio economic characteristics of the respondents**

| Variables | Frequencies | Percentages | Means Score ($\bar{x}$) |
|---|---|---|---|
| **Age** | | | |
| 18-28 | 21 | 11.7 | |
| 29-39 | 26 | 14.4 | |
| 40-50 | 107 | 59.4 | 40 |
| 51-61 | 14 | 7.8 | |
| 62 &above | 12 | 6.7 | |
| **Gender** | | | |
| Male | 96 | 53.3 | |
| Female | 84 | 46.7 | |
| **Marital Status** | | | |
| Single | 49 | 27.2 | |
| Married | 115 | 63.9 | |
| Divorced | 3 | 1.7 | |
| Widowed | 13 | 7.2 | |
| **Education** | | | |
| No formal Education | 2 | 1.1 | |
| Primary | 45 | 25.0 | |
| Secondary | 102 | 56.7 | |
| Tertiary | 31 | 17.2 | |
| **Total income(₦)** | | | |
| 11,000-30,000 | 122 | 67.8 | 13,200.76 |
| 31,000-50,000 | 39 | 21.7 | |
| 51,000-70,000 | 12 | 6.7 | |
| 71,000-90,000 | 4 | 2.2 | |
| 91,000-110,000 | 3 | 1.7 | |
| **Farmers' cooperatives** | | | |
| No | 144 | 80.0 | |
| Yes | 36 | 20.0 | |
| **Farming Experience** | | | |
| 1—5 | 12 | 6.7 | |
| 6—10 | 107 | 59.4 | |
| 11—15 | 37 | 20.6 | 8 |
| 16 & above | 24 | 13.3 | |
| **Extension Visit** | | | |
| Yes | 30 | 16.7 | |
| No | 150 | 83.3 | |
| **Access to credit** | | | |
| Yes | 145 | 80.6 | |
| No | 35 | 19.4 | |

**Source: Field Survey data 2023**

**Indigenous Coping Strategies to Climate Change Adopted by Cassava Farmers**

Table 2 presents 15 indigenous adaptation practices to climate change to the respondents. These practices were analysed. Ten (10) practices showed a high level of adoption. These were mulching with mean score of ($\bar{x}$ = 3.822), organic manure ($\bar{x}$ = 3.817), mixed cropping and cover cropping ($\bar{x}$ = 3.878 ), early maturing varieties ($\bar{x}$ = 3.839), Improved varieties ($\bar{x}$ = 3.850), relay cropping ($\bar{x}$ 3.678), total dependence on rain ($\bar{x}$ = 3.656), early planting ($\bar{x}$ 3.061, pests and diseases resistant varieties ($\bar{x}$ = 3.706), and changes in planting period ($\bar{x}$ = 3.561). This study collaborates with Ajaero, *et al*., (2013), and agrees with Ekanem and Okon (2017) who found that 80% of arable crop farmers in Akwa Ibom State utilized Mixed cropping. Again, the study agrees with Oduntan et al, (2021) who found that the use of cover crops and altering planting schedules were part of the coping strategies used by cassava farmers in Ondo State. The results, however, disagree with Ekanem (2023) only on the use of mulching by arable crop farmers as an indigenous adaptation strategy but corroborate Ekanem et al, (2024) on the use of Organic manure, Mixed cropping, improved varieties, and Changes in planting periods. Some of the respondents, during FGD also consented to the use of mixed cropping, mulching, organic manure and cover cropping to mitigate effects of climate change in their farms. Other respondents went further, to confirm that they are addictive and unwilling to change from these indigenous methods because they are not costly and are easy to practice. This was likely because of the income level of the respondents in the study area.

**Table 2: Indigenous Coping Strategies to Climate Change Adopted by Cassava Farmers in Akwa Ibom State. Nigeria**

| S/N | Indigenous Coping Strategies | Never | Rarely | Regularly | Mean | Std. Deviation |
|---|---|---|---|---|---|---|
| 1 | Mulching | 1(0.6) | 1(0.6) | 178(98.8) | 3.822 | 0.461 |
| 2 | Organic manure | 1(0.6) | 4(2.2) | 175(97.2) | 3.817 | 0.521 |
| 3 | Mixed cropping | 2(1.2) | 4(2.2) | 174(96.6) | 3.878 | 0.328 |
| 4 | Cover cropping | 3(1.7) | 4(2.2) | 173(96.1) | 3.878 | 0.328 |
| 5 | Early maturing varieties | 4(2.2) | 5(2.8) | 171(95.0) | 3.839 | 0.410 |
| 6 | Improved varieties | 6(3.3) | 7(3.9) | 167(92.8) | 3.850 | 0.372 |
| 7 | Relay cropping | 6(3.3) | 7(3.9) | 167(92.8) | 3.678 | 0.544 |
| 8 | Total dependence on rainfall | 7(3.9) | 7(3.9) | 166(92.2) | 3.656 | 0.599 |
| 9 | Early planting | 8(4.4) | 9(5.0) | 163(90.6) | 3.061 | 0.701 |
| 10 | Pests and diseases resistant varieties | 9(5.0) | 10(5.6) | 163(90.6) | 3.706 | 0.456 |
| 11 | Changes in the planting period | 51(28.3) | 102(56.7) | 27(15.0) | 2.117 | 0.755 |
| 12 | Use of bio-control measures | 17(9.4) | 96(53.3) | 67(37.2) | 2.267 | 0.735 |
| 13 | Terracing/land location | 12(6.6) | 12(6.6) | 157(87.2) | 2.367 | 0.8 |
| 14 | Planting of trees | 45(25.0) | 94(52.2) | 41(22.8) | 3.067 | 0.757 |
| 15 | Tillage | 51(28.3) | 102(56.7) | 27(15.0) | 2.117 | 0.755 |

Source: field survey 2023

## RECOMMENDATIONS

Based on the results of the study, the following recommendations were made.

- There should be a comprehensive reconsideration in policy formulation with the rest of the world toward climate change with the introduction of indigenous practices into the mainstream of policy guidelines to address climate change issues.
- There is a need for more robust collaboration among cassava farmers and stakeholders for evolving innovative approaches and adaptive measures for the climate change phenomenon in the State.

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