ADOPTION OF CLIMATE SMART AGRICULTURAL PRACTICES AMONG CASSAVA FARMERS IN ORASHI REGION OF RIVERS STATE

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Abstract
The study investigates the adoption of climate-smart agriculture (CSA) practices among cassava farmers in Orashi region of Rivers State, Nigeria. The specific objectives were to examine the socioeconomic characteristics of the respondents, determine the level of awareness of CSA practices, assess level of adoption of CSA practices and examine the socio-economic factors affecting the adoption of CSA practices. Multi-stage sampling techniques were adopted in selecting the sample from the population. Primary data were collected using structured questionnaire and interview schedule while secondary data were collected via journals and other printed materials from the internet. Data were analysed using descriptive statistics such as percentages and mean. The study revealed that 77.78 % of the respondents were females. The study further revealed that the farmers were aware of the CSA practices ***(Grand mean = 3.25)****. The study also revealed low adoption of CSA practices in cassava production among the farmers* ***(Grand mean = 1.91).*** *Despite the awareness of CSA practices by the cassava farmers as revealed in the study, barriers such as limited access to information (M =3.58), limited financial resources (3.40, land tenure security (M = 3.17), limited access to market (M= 3.31), limited social network (M= 3.52), lack of training (M= 3.48), cultural believes (M= 3.17), government policies and support (M = 3.08), risk perception (M= 2.93) and labour availability (M = 3.48) affected the uptake of CSA practices among the farmers. Based on the findings, the study recommended among others the need for gender mainstreaming in promoting CSA practices and also the need for targeted interventions by both public and private sectors in promoting uptake of CSA practices among cassava farmers in the study area.*
Keywords: Climate-smart, agricultural practices, cassava-farmers, climate-change,

Introduction

Climate change poses significant challenges to agricultural productivity, particularly in regions heavily reliant on staple crops such as cassava. In Orashi of Rivers State, where cassava serves as a primary source of food and income for many farming households, the adoption of climate-smart agricultural practices is critical for enhancing resilience to climate variability and ensuring food security (Nwankwo et al., 2020). Climate-smart agriculture (CSA) encompasses a range of practices aimed at increasing productivity while reducing greenhouse gas emissions and enhancing resilience to climate change (FAO, 2013).

The concept of CSA has gained prominence in recent years as farmers face increasing threats from climate-related phenomena such as erratic rainfall patterns, rising temperatures, and extreme weather events (Thornton et al., 2018). In Nigeria, studies have shown that smallholder farmers are particularly vulnerable to these changes due to limited access to resources, lack of information, and adaptive technologies (Adeleke et al., 2021). As a result, understanding the socio-economic factors that influence the adoption of CSA practices among cassava-based farmers in region is essential for formulating effective intervention programs and policies related to mitigating the effect of climate change and variability. Several studies have highlighted the importance of socio-economic factors in the adoption of agricultural innovations. For

instance, education level, access to credit, and land tenure security have been identified as critical determinants of technology adoption among farmers (Obi et al., 2019; Ojo et al., 2022). Additionally, the role of extension services in disseminating knowledge and facilitating access to climate-smart practices cannot be overstated (Ayanlade et al., 2019).

However, despite the growing body of literature on CSA, there remains a gap in understanding the awareness and adoption levels of CSA practices, specific barriers and enablers affecting cassava farmers in Orashi region of Rivers State. This research aims to fill this gap by assessing the current levels of awareness and adoption of climate-smart agriculture practices among cassava farmers in the area and identifying the socio-economic factors that influence adoption level of cassava farmers. By doing so, the study seeks to provide actionable recommendations for policymakers and agricultural stakeholders to enhance climate smart agriculture practices in the face of reducing the effect of climate change and variability.

The broad objective of this study is to determine the level of adoption of climate smart agricultural practices among cassava farmers in Orashi region of Rivers State. Specifically, the study seeks to; examine the socio-economic characteristics of the respondents; determine the level of awareness of climate-smart agriculture practices among cassava farmers in the study area; determine the level of adoption of climate-smart agriculture practices among cassava farmers in the study area, and identify the socio-economic factors affecting the adoption of climate-smart agriculture practices among cassava farmers in the study area

Methodology of the study

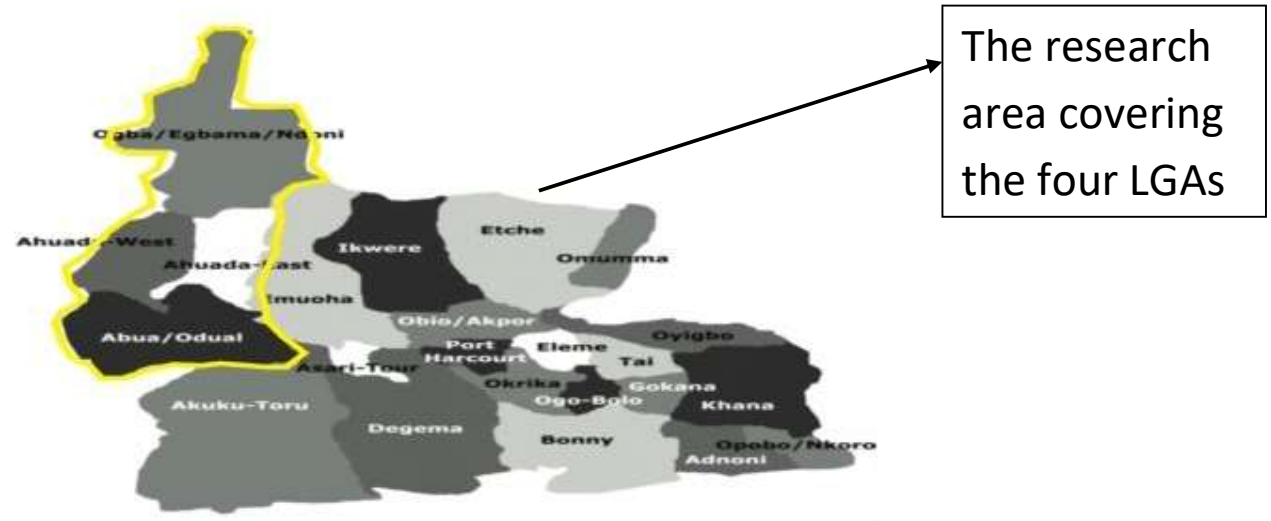

Fig. 1: Map of Rivers State showing the four Local Government Areas that makes up the Orashi Region.

The Orashi region in Rivers State is a culturally rich and ecologically diverse area, comprising the Local Government Areas of Ahoada East, Ahoada West, Abua-Odua, and Ogba-Egbema-Ndoni. This region is notable for its traditional languages, cultural practices, and religious beliefs, reflecting the heritage of its seven major ethnic groups: Abua, Odua, Ekpeye, Ngene, Ogba, Egbema, and Ndoni. The predominantly agrarian population benefits from the fertile land provided by the rainforest ecosystem, which is interspersed with streams, lakes, and rivers that support diverse wildlife. The climate is characterized by a wet season from April to November, during which the region receives significant rainfall (200-300 cm) and maintains high humidity levels around 80%. Temperatures typically range between 20°C and 30°C, with moderate wind speeds contributing to the overall weather patterns (Abali, et al., 2011)

In addition to its agricultural activities, the Orashi region is situated in an oil-rich zone of Rivers State, hosting operations from several multinational oil companies such as Nigeria Agip Oil Company (NAOC), Elf Petroleum Nigeria Limited (EPNL), and Shell Petroleum Development Company (SPDC). This industrial presence further shapes the economic landscape of the region, influencing both local livelihoods and environmental considerations. The Orashi region stands out not only for its natural resources but also for its cultural diversity and traditional practices, making it a significant area within Rivers State. The population of study comprises of all the cassava-based farmers in Orashi region of Rivers State. Multi-stage sampling procedure was used in selecting the sample from the population. At first, three (3) Local Government Areas (Ahoada East, Ahoada West and Ogba/Egbema/Ndoni) were purposively selected out of the four local government areas that makes up the region. The second stage involves the selection of six (6) communities from each of the three selected local government areas using simple random sampling technique. This gave a total number of eighteen (18) communities. Stratified random sampling technique was adopted at the third stage to select five (5) respondents from each of the selected eighteen (18) communities, this gave a total of ninety (90) respondents that were interviewed accordingly. The primary data for this study were collected using a well-structured questionnaire interview schedule. Secondary data were obtained through review of relevant literatures from journals, books, and internets to elicit information necessary for the study. Data were analysed using descriptive statistics such as percentages and mean scores.

Results and discussion

Table 1: Distribution of Respondents by Selected Demographic Characteristics (N=90).

Selected Personal Characteristics	Frequency	Percentage (%)
Age (Years)		
21-30	02	2.20
31-40	06	6.70
41-50	22	24.44
51-60	60	66.66
Above 60	-	-
Sex		
Male	20	22.22
Female	70	77.78
Marital Status		
Single	5	5.56
Married	65	72.22
Divorced	10	11.11
Widow	10	11.11
Widower	-	-
Number of Children		
0	2	2.22
1-5	20	22.22

6-10	50	55.56
Above 10	18	20.00
Livelihood activities		
Farming only	70	77.78
Farming and other entrepreneurship	20	22.22
Education		
Non-formal	9	10.00
Adult literacy	28	31.11
Primary	10	11.11
Secondary	32	35.56
Tertiary	11	12.22
Religion		
Christianity	86	95.56
Muslim	-	-
Traditional religion	4	4.44

Source: Field survey, 2025

Demographic characteristics of the respondents

Table 1 shows socio-economic characteristics of the respondents selected which were analysed under the following sub-headings: age, sex, marital status, number of children, livelihood activities, educational attainment, and religion. Responding on the age, it was revealed that 2.20% of the respondents were within the age bracket of 21-30 while 6.70% were within the age bracket of 31-40. Within the age bracket of 41-50 were 24.44% while within the age bracket of 51-60 were 66.6%. This implies that most of the respondents were still at their productive age. Result of the analysis in Table 1 further shows that 77.78% of the respondents were females while 22.22% were males. This finding is in line with Abali *et al* (2011) who observed that most women play active roles in cassava production and processing and also indulge in income generating activities than their male counterparts. Responding on the marital status, it was revealed that 5.56% of the respondents were not yet married while 72.22% were married. 11.11% of the respondents were divorced while widowhood recorded 11.11%.

The analysis of Table 1 further revealed that 2.22% of the respondents had no children while 22.22% of the respondents had children within the range of 1-5, those who had within the range of 6-10 children recorded 55.56% while 20.00% of the respondents had above 10 children. Responding on livelihood activities, it was revealed that 77.78% of the respondents engaged solely on farming (cassava production activities) while 22.22% engaged in farming and other entrepreneurship activities. This is corroborated with the study of Oyesola & Kadiri (2010) who observed that most grassroots are engaged in farming activities as their major source of livelihood. Responding on the educational attainment of the respondents Table 1 revealed that 10% had no formal education while 31.11% of the respondents were involved in adult literacy programme, 11.11% had primary education as their highest educational qualification, 35.56% had secondary education

while 12.22% had their tertiary education. Table 1 further revealed that 95.56% of the respondents were Christians while 4.44% of the respondents were traditionalists.

Table 2: Mean scores on level of awareness of climate-smart practices in cassava production among cassava-based farmers in Orashi region of Rivers State.

Climate-smart practices	Mean	SD	Remarks
Utilization of drought-resistant varieties	3.41	1.36	Aware
Intercropping	3.22	0.96	Aware
Agroforestry	3.48	0.85	Aware
Integrated Pest Management (IPM)	3.16	1.02	Aware
Mulching	3.34	0.83	Aware
Efficient Water Management	3.27	0.89	Aware
Crop rotation	3.13	1.00	Aware
Fertilizer Management (organic manure)	3,04	1.02	Aware
Climate Information Services	3.18	0.97	Aware
Adequate timing	3.30	0.90	Aware
Grand mean	**3.25**		

Source: Field survey, 2025
Midpoint = 2.5
Any mean score < 2.5 = not aware, Any mean scores ≥ 2.5 = Aware

Level of awareness on climate smart agricultural practices in cassava production

Table 2 reveals the mean scores of the respondents on level of awareness of climate smart agricultural practices in cassava production. Responding on the climate smart agricultural practices, the use of drought-resistant varieties recorded (M = 3.41), intercropping recorded (M = 3.22), agroforestry recorded (M = 3.48), integrated pest management (M = 3.16), mulching (M = 3.24), efficient water management (M = 3.27), crop rotation (M = 3.13), Fertilizer management (M = 3.04), climate smart information services (M = 3.18) while adequate timing recorded a mean score of 3.30. These findings indicate that the respondents are aware of the climate smart agriculture practices in cassava production. The findings corroborate the findings of Nwankwo et al., (2021) who also reported higher awareness level, with approximately 60 % of cassava farmers recognising at least one climate-smart practice or the other.

Table 3: Mean scores on level of adoption of climate-smart practices in cassava production among cassava farmers in the study area

Climate-smart practices	Mean	SD	Remarks
Utilization of drought-resistant varieties	3.41	1.36	High adoption
Intercropping	1.88	0.96	Low adoption
Agroforestry	1.75	0.93	Low adoption
Integrated Pest Management (IPM)	1.76	0.89	Low adoption
Mulching	1.73	0.88	Low adoption
Efficient Water Management	1.81	0.98	Low adoption
Crop rotation	1.71	0.94	Low adoption
Fertilizer Management (organic manure)	1.69	0.82	Low adoption
Climate Information Services	1.72	0.91	Low adoption
Adequate timing	1.64	0.98	Low adoption
Grand mean	**1.91**		

Source: Field survey, 2025
Midpoint = 2.5

Any mean score < 2.5 = low adoption, Any mean scores ≥ 2.5 = High adoption

Level of adoption on climate smart agricultural practices in Cassava production

Table 3 shows the mean scores on the level of adoption of climate smart agricultural practices in cassava production among cassava farmers in the study area. Utilization of drought-resistant varieties of cassava stem recorded (M = 3.41) which implies high adoption. Other climate- smart agricultural practices such as intercropping recorded (M= 1.88), agroforestry (M= 1.75), integrated pest management (M = 1.76), mulching (M = 1.73), efficient water management (M = 1.81), crop rotation (M = 1.71), fertilizer management (M= 1.69), climate information services (M = 1.72), adequate timing recorded (M = 1.64). These findings revealed the respondents were unable to adopt most of climate-smart practices except in the use of resistant varieties that recorded a high adoption. These findings corroborate with Assefa et al. (2021) who reported that the adoption of climate-smart agriculture practices is crucial for enhancing the resilience of cassava production systems, particularly in the face of climate change. However, the authors further reported that the uptake of these practices among Cassava farmers remains low.

Table 4: Mean scores on socio-economic perceived factors affecting the adoption of climate-smart agricultural practices among cassava farmers in Orashi region of Rivers State.

Factors	Mean	SD	Remarks
Limited access to information	3.58	0.70	Great extent
Limited financial resources	3.40	0.85	Great extent
Land tenure security	3.17	0.95	Great extent
Limited access to market	3.31	0.85	Great extent
Limited social network	3.52	0.83	Great extent
Lack of training	3.48	0.74	Great extent
Cultural beliefs	3.17	0.82	Great extent
Government Policies and Support	3.08	0.95	Great extent
Risk perception	2.93	0.99	Great extent
Labour availability	3.48	0.74	Great extent
Grand mean	**3.31**		

Source: Field survey, 2025

Midpoint = 2.5; Any mean score < 2.5 = little extent, Any mean scores ≥ 2.5 = great extent

Perceived socio-economic factors affecting the adoption of climate-smart agricultural practices among cassava-based farmers in Orashi region of Rivers State.

Table 4 reveals the socioeconomic perceived factors affecting the adoption of climate-smart agricultural practices among cassava-based farmers in Orashi region of Rivers State. It was revealed that limited access to information affected the adoption of climate-smart agricultural practices to a great extent (M= 3.58). This finding corroborates with Manda et al., (2016) who discovered in their study that limited access to information construed an inhibiting factor to adoption of climate-smart agriculture practices among smallholder farmers. Responding to limited financial resources, Table 4 revealed that limited financial resources (M=3.40)) was perceived as a factor affecting the adoption of climate smart agricultural practices. This finding corroborates with Ogunlela and Mukhtar (2009) who in their study found that the costs associated with implementing new practices can be a barrier, especially for smallholder farmers who may lack financial resources. They suggested that financial support and incentives could facilitate the adoption of CSA.

Other factors such as land tenure security (M = 3.17), limited access to market (M= 3.31). limited social network (M = 3.02), lack of training (M = 3.45), cultural belief (M = 3.17), lack of government policies and support (M = 3.08), risk perception (M = 2.93) and labour availability (M = 3.48) as revealed in Table 4

were perceived as socio economic factors affecting the adoption of climate-smart agriculture practices to a great extent. These findings corroborate the findings of Manda *et al*., (2016); Asfaw *et al*., (2017); Adeyemo *et al*., (2022) who in their studies reported that access to information, financial resources, education, and social networks significantly influence farmers' decisions to adopting CSA practices.

Conclusion

The study hereby concluded that female cassava farmers were more than their male counterparts. Despite the awareness of CSA practices by the respondents, the low adoption of climate-smart agriculture practices among cassava farmers in the study area were influenced by a combination of barriers such as lack of access to information, cultural belief, limited social network, risk perception in CSA, lack of government policy and support among others.

Recommendations

Based on the findings of this study, the following recommendations were made:

i. Gender mainstreaming among cassava farmers is hereby recommended as it will help in promoting effective uptake of CSA practices
ii. Targeted interventions by both public and private sectors in promoting adoption of climate-smart agriculture practices among cassava farmers should be put in place.
iii. Government should make workable policies by creating support mechanisms and enhanced agricultural extension services to promote uptake of CSA among cassava farmers in the study area.

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