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ASSESSMENT OF CASSAVA FARMERS PERCEPTION AND USE OF CLIMATE SMART AGRICULTURAL PRACTICES IN ANAMBRA STATE NIGERIA

By

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Abstract

This study examined cassava farmers' use of Climate-Smart Agricultural Practices (CSAPs) in Anambra State, Nigeria. A multi-stage sampling technique was employed to select 200 cassava farmers, while descriptive statistics, Relevant importance index and regression analysis were used to analyse the data collected. The results revealed that cassava farming is predominantly carried out by married males within the active age bracket of 43 years, with an average farming experience of 14.5 years. Most farmers were literate and operated on a small-scale, part-time basis. Awareness of CSAPs was high, and CSAPs were strongly perceived as intercropping, application of manure, and crop rotation. The output of RII showed that the preferred use of CSAPs was skewed toward low-cost practices such as manure application (RII=0.916), Crop rotation (RII=0.899) and intercropping (RII=0.899), while resource-intensive practices like mulching, agro forestry and controlled flooding ranked lowest with RII=0.382, RII=0.222, and RII=0.219 respectively. Age and years of experience in cassava farming had negative effect on the number of CSAPs used, while the number of extension visits, household size, access to credit, and awareness positively determined the number of CSAPs used. Major constraints to utilization of CSAPs included inadequate finance, poor government support, high input and labor costs, and scarcity of farmland. The study concludes that cassava farmers are aware and positively disposed toward CSAPs, but socio-economic and institutional barriers hinder widespread adoption. It recommends improved access to credit, strengthened extension services, subsidized inputs, promotion of cooperatives, and training to enhance adoption of a wider range of CSAPs.

Keywords: *Climate-smart, Agricultural practices, Cassava, Farmers, CSAPs, Utilization*

INTRODUCTION

1.1 Background information

Agriculture, undoubtedly, represents the most crucial source of livelihood in many poor countries and contributes immensely to the economy by; being a source of employment, providing food and raw materials that serve as input for the industrial sector and contributing to international trade, exports, household income etc (Emenyonu et al., 2020; Nwoye et al., 2022). Agriculture underpins economic stability and is critical to ensure food security, particularly given the majority reliance on subsistence farming (Onubogu, et al. 2022).

In most cases, agriculture and rural development are closely interlinked, as the former relies on a rural base. However, this poses many challenges, due to the unstoppable growth of global population, combined with weak productivity in agricultural sector most often linked to climate change. Climate change is an important issue that has further complicated agricultural development over the years. This is because Agricultural activities rely greatly on climate for the pattern of vegetation, types and yield of crops and animals as well as the length of cropping seasons. Hence, any change in climate affects the production and supply of food and raw materials. Climate change, which is often described as a longtime shift in temperature and weather patterns (increase in

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mean air temperatures sea-level rise, change in rainfall patterns etc), deeply affects agriculture (Adekoya et al. 2023, Onubogu, 2021; Akinlabi et al., 2017).

Haider, (2022) reported that the Nigerian climate has been changing, evident in increase in temperature, variable rainfall, rise in sea level and flooding, drought and decertification land degradation, more frequent extreme weather events, affected freshwater resources, and loss of biodiversity. These effects result in unfavorable growing conditions and altered growing season that may lower productivity, reduce crop yields, and reduce irrigation water.

Nigeria produces a wide variety of crops ranging from roots and tubers to grains, legumes, vegetables etc. Cassava is one of the major crops produced in Nigeria that is grossly affected by climate change and climate variability (Gbadebo et al. 2022; Uduma and Nwaobiala, 2024). Globally, Nigeria is known as a producer of cassava. Cassava production plays a principal role in the building of Nigeria food economy, where about 84% is consumed locally while only about 16% serves as raw material for industrial use. Cassava is a drought tolerant crop that grows on marginal land under moderate climatic conditions where other food crops fail (Food and Agricultural Organisation (FAO) 2013; Olabisi et al., 2023). However, the extreme weather conditions in Nigeria, such as flooding, prolonged drought, increased temperature and erratic rainfalls have led to reduced cassava output. Olabisi et al., (2023) reported evidences that climate change induces an increase in the incidence of pest and disease, stunted growths discoloration of cassava roots leaves, reduced cassava tubers, increased the rates of tuber decays and pre-harvest losses in cassava farming and invariably raised the unit cost of cassava derivatives. Consequently, farmers pay dearly through low productivity, and profitability when this disaster hits (Olabisi et al., 2023). To reduce or escape the negative effects of the persisting climate change, farmers adopt adaptation strategies that contribute to the realization of climate smart agriculture (CSA).

CSA is an approach that focuses on the farmers by supporting them to increase their resilience to climate change and other environmental shocks. The CSA practices (CSAPs) involve innovations on farms aimed at enhancing the resilience of small producers and demonstration of other farming practices, and simple adaptation technology, which can improve the productivity of their enterprise and reduce their vulnerability to environment risks (Mbanasor et al., 2024). FAO developed the concept of Climate Smart agriculture in response to the need to increase food security without compromising environmental quality and in support of the Paris agreement on climate change (FAO, 2019). Some CSA practices, e.g. intercropping/multiple cropping, agroforestry, conservation agriculture etc are quite widespread and their proliferation has been facilitated by ease of adoption, and multiple benefits, such as food, income diversification, and improve resilience (FAO, 2019).

In spite of the concerns and efforts by relevant organisations and agencies about the sustainability of agriculture and a check on climate change, cassava production, which is an essential aspect of agricultural production in Nigeria, has been adversely affected by variability in weather-related indicators which lead to low cassava yield and low income (Gbadebo et al., 2022; Uduma and Nwaobiala, 2024). Gbadebo et al. (2022) further noted that though the adoption of CSAPs by cassava farmers has the capacity to increase their climate-adaptational skills, improve agricultural yields and enhance food security goals, farmers still find it a bit challenging to use and adopt CSAPs appropriately. Mbanasor et al. (2024) acknowledged that though CSAPs are recognized and adopted to an extent by farmers, their utilization/implementation is insufficient to combat the effects of climate change. The adoption of various CSAPs among crop farmers in most South Eastern parts of Nigeria has been constrained by socioeconomic, financial, biophysical, cultural and climate related barriers, policy and institutional framework, and dissonance in the perceived awareness of CSAPs and utilization of climate agricultural technology between state actors and farmers (with state actors emphasizing lack of awareness as a barrier of adoption, while farmers expressed knowledge ability regarding environmental change, and climate smart practices but are confined by limitations and restrictions posed by market mechanism, land tenure issues and lack of resources) (Gikunda, 2022; Osuafor, et al. 2023; Mbanasor et al. 2024).

Many farmers in rural areas still face obstacles that hinder ability to effectively respond to climate change condition even though they have carried out different adaptation strategies. Gikunda, (2022) further suggested that effective dissemination and adoption of CSAPs would require appropriate communication channels and an understanding of the local language, since farmers are more likely to adopt the practices based upon the past experience with ecologically responsible behavior (Osuafor, et al. 2023).

So, from the ongoing discussion, several issues have been raised which need to be addressed. Hence, this study assessed cassava farmers' perception and use of CSAPs in Anambra State and, identified the constraints to farmers' utilization of CSAPs. We hypothesized that the socio economic characteristics of the cassava farmers do not have significant effect on the number of CSAPs used.

Cassava Farmers Perception on Climate-Smart Agriculture stems from the crucial role cassava farming plays in the livelihood of farmers in the region, as well as the increasing challenges posed by climate change to agricultural practices. Hence, the findings of this research will not only reveal the perception of the farmers, but will also expose new innovation methods and practices from the area that could help in combating climate change.

Materials and Methods

The study was conducted in Anambra State, South East Nigeria. Historically, Anambra State is known for farming and commercial activities, cherishing the traditional way of life. The fertile soil of the land has facilitated a thriving agricultural community. The people engage in different

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Agricultural activities which range from cultivating staples like cassava and yams to various vegetables. However, the area is particularly susceptible to the impact of climate change, making it an ideal location for investigating how farmers respond to this challenge.

The population of this study includes all cassava farmers in Anambra State. A multi stage sampling procedure was employed in selecting a sample of 200 farmers for the study. In the first stage, two Agricultural zones, Anambra and Awka zones, were purposively selected due to their high rate of cassava production. In the second stage, 100 farmers were selected from each of the two zones using a random sampling technique. This gave a total of 200 respondents for the study.

Measurement of Variables

Level of awareness and perception of CSAP

To determine the level of awareness and perception of CSAPs among the farmers, the respondents indicated their choices categorised as follows on a 4 -point Likert scale; Strongly agree (SA)=4, agree (A)=3, disagree (D)=2, strongly disagree (SD)=1. The sum of the scores (4+3+2+1) =10, was divided by 4 to obtain a mean score of 2.5. Any factor with mean score >2.5 was regarded as how CSAP is perceived by the farmers in the area, while any mean score <2.5 was regarded otherwise.

CSAP used by the farmers

To determine the CSAPs used by the farmers, the respondents were asked to indicate on the 4-point Likert type scale. Their response was categorised as follows: to greater extent (TGE)=4, to some extent (TSE)=3, to little extent (TLE)=2, to no extent (TNE)=1. The details from the Likert scale were further used to identify the preferred CSAPs used. This was done with the aid of Relevant Importance Index (RII). This was adopted from Baffor-Ata et al. (2025).

Relevant Importance Index (RII)

The RII was used to rank the CSA practices used based on their perceived importance by the respondents. The RII was calculated using the formula:

$$RII = \frac{\sum W}{A \times N} = \frac{\sum(W_i X_i)}{AxN}$$

Where:

W = the weight given to each factor by the respondents and ranges from 1 to 4 in this case (“1” indicates “to no extent”, “2” is “to little extent”, and “3” is “to some extent”, and ‘4’ indicates “to a great extent”).

(W = $\sum(W_i X_i)$ = weight assigned to each factor multiplied by number of respondents that made a choice of the weight for each factor)

A = the highest weight (in this case, 4), and
N = the total number of respondents (60).

The RII can range from 0 to 1, where a higher value indicates a higher importance or priority of the factor or criterion.

Constraints to the utilization of CSAPs

To know the constraints limiting these farmers from using CSAPs, the respondents indicated their choices on A 5-point Likert scale specified as follows; Very serious (VS=5), Serious (S=4), Undecided (UND = 3), Unserious (U = 2), Very unserious (VU =1). 5+4+3+2+1=15. 15/5 =3. A mean score of 3 was taken. Therefore, any constraint with a mean score greater than 3 was accepted as a significant constraint while anyone less than 3 was not significant.

Model specification

To determine the effect of socio economic characteristics of the respondents on the number of CSAPs they used, a multiple regression analysis was used. The socio-economic factors of the respondents that were considered, including; sex (SEX), age (AGE), educational attainment (EDU), marital status (MAS), years of farming experience (YOE), Number of extension visits (NEV), Cooperative membership (CM), household size (HHS), land ownership (LDO), access to agric credit (ATC) and awareness of CSAPs (ACP).Hence, the model was specified thus:

$$NOPU = a + b_1SEX + b_2AGE + b_3EDU + b_4MAS + b_5YOE + b_6MOC + b_7NEV + b_8HHS + b_9LDO + b_{10}ATC + b_{11}ACP$$

Where :
NOPU = number of CSAPs used (the dependent variable)
A=constant

b_1…...b_{11}= coefficients of the independent variables
SEX=sex of respondents
AGE=age of respondents
EDU= years spent in formal education setting
MAS=marital status
YOE=years of experience
MOC = membership of cooperative
NEV = number of Extension visit
HHS=household size
LDO=land ownership
ATC=access to agricultural credit
ACP= Awareness of CSAPs

RESULTS AND DISCUSSION

Socio-economic characteristics of the farmers

Table 1 presents, the socio-economic characteristics of the cassava farmers. The results revealed that male farmers constitute 62% of the respondents, while female farmers make up 38%, indicating that cassava production in the area is dominated by men. This is consistent with the findings of Balogun et al (2024), which also reported a dominance of male participants in cassava farming, and this is not surprising considering the much labor involved in cassava farming. The age distribution shown in the table revealed that the mean age of the respondents was 42.8 years (which is approximately 43 years). This is an indication that the farmers are within their active age. This also suggests that the farmers have active and agile minds that will help in adopting new ideas and innovation techniques that would help in increasing productivity and efficiency among cassava producers. This supports the findings of Olugbenga et al. (2023).

The finding on marital status of the farmers shows that most (63%) were married Similarly, Olugbenga et al. (2023) asserted that the married farmers dominated due to the need to

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provide for the family. This further proves that cassava farming is a source of livelihood as it supports family upkeep. An analysis of the educational status of the farmers revealed that only 7% of the farmers had no formal education, while a majority (48%) of the farmers had secondary education. This implies that most of the farmers are educated enough to read and write, hence, they have the ability to understand new innovations. The mean farming experience was 14.5 years, and this is an indication of a high level of exposure and experience in cassava farming, and it also shows that they have been farming long enough to be trusted to make crucial decisions on cassava enterprise. Long years of experience in cassava production would enable the farmers to be more acquainted with the constraints and challenges of cassava production, and this would increase cassava farmers' level of acceptance of new ideas and innovations of overcoming the problems.

Table 1 further reveals an average household size of 6 persons. The implication of this large household size is that the farmer can rely on family labor in the production process. Farmers' cooperative groups play essential roles in various activities of the farmers. The finding of this research however established that as many as 53% of the respondents were not members of farmers' cooperative association. This contradicts the findings of Olabisi et al. (2023) who reported that majority of the cassava farmers belonged to a cooperative organization. The respondents affirmed that extension visits were made by extension agents, and this is confirmed by the fact that 63% of the respondents had contacts with extension agents. The average farm size of 6.4 plots (less than a hectare) confirms that cassava production in the area is on small scale basis. on the contrary, The finding of less than a ha in this research further suggests that most farmers do not rely solely on cassava farming for their livelihood. They may have other jobs, businesses, or income sources. The land ownership results reveals that majority (62%) produced on personal lands (family inherited etc),. This confirms that land ownership is relatively common among farmers in the area.

Table 1 finally reveals that most (78%) of the farmers were aware of climate smart agricultural practices. Baffour-Ata et al. (2025) in a study on assessing CSAPs and socio-economic determinants in Ghana also reported that the 94% farmers were aware of CSAPs.

Table 1: Socio-economic characteristics of the farmers

Variable	Frequency	Percentage (%)	Mean (Mode)
Age (years)			42.8 years
20-40	88	44	
41 – 60	96	48	
>60	16	08	
Sex			(Male)
Male	124	62	
Female	76	38	
Marital status			(Married)
Married	126	63	
Single	74	37	
Years in School			9 years
No formal education (0)	14	7	
Primary education (1 – 6 years)	54	27	
Secondary Education (7 – 12 years)	96	48	
Tertiary (>12 years)	36	18	
Farming experience (years)			14.5 years
1 – 5	54	27	
6 – 10	30	15	
>10	116	58	
Household size			6 persons
1 – 5	90	45	
>5	110	55	
Extension visits per season			2 times
0	74	37	
1-5	104	52	
>5	22	11	
Land ownership			(personal land)
Personal land	124	62	
Hired	76	38	
Mode of operation			(Part-time)
Part time	134	67	
Full time	66	33	
Farm size (plot)			6.4 plots (<1 hectare)
≤5	134	67	
>5	66	33	
Cooperative membership			(No)
Yes	94	47	
No	106	53	

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Aware of CSAPs		(Yes)
Yes	156	78
No	44	22

Source: Field survey, 2025.

Level of perception of CSAPs

Findings on the level of perception of CSAPs are shown on Table 2, with the variables captured using a 4-point Likert scale. A majority of the farmers perceived inter-cropping as the most common CSAPs (with the highest mean score of 3.8). This could be because it's direct, observable and cheap (almost at no extra cost). This was followed (in order of most perceived to the least perceived) by practices like application of manure, crop rotation, soil conservation techniques, mixed farming, usage of improve cassava production technology, organic farming, irrigation and water management, tillage and residue management, adoption of climate resistant crop varieties, use of droughts resistance crop varieties, integrated pest management, cover, crop and green manure, planting of trees around the farm, and mulching. However, the farmers did not perceive controlled flooding before and during cultivation to be a form of CSAPs.

The results were in line with the findings of Baffour-Ata et al. (2025) who revealed that farmers were aware of CSAPs with most of them being aware of practices like intercropping, organic farming, crop rotation, and drought resistant crop varieties as CSAPs. Similarly, Onubogu, (2021) explained that farmers with more information on CSAPs utilize more CSAPs.

Table 2: Level of perception of CSAPs

Practices	Mean	Position	Decision
Intercropping	3.80	1st	A
Application of manure	3.60	2nd	A
Crop rotation	3.50	3rd	A
Soil conservation Techniques	3.30	4th	A
Mixed farming	3.20	5th	A
Usage of improved cassava production techniques	3.20	5th	A
Organic farming	3.10	7th	A
Irrigation and water management	3.10	7th	A
Tillage and residue management	3.10	7th	A
Adoption of climate resistance	3.08	10th	A
Use of drought resistance crop	3.05	11th	A
Integrated pest management	3.03	12th	A
Cover crop and green manure	2.80	13th	A
Agroforestry	2.70	14th	A
Mulching	2.60	15th	A
Controlled flooding	2.10	16th	DA

Source: Field survey, 2025. Note: A=Agreed; DA=Disagreed. Every mean score <2.5 means that such practice is not perceived as a CSAP, while mean scores of 2.5 and above mean otherwise.

CSAPs used by the farmers

Table 3 provides insights into various climate-smart agricultural used by the cassava farmers in the study area. The findings revealed that the respondents prioritized 16 CSAPs in the study area. There were also variations in the degree of usage across the practices. Using a 4-point Likert scale, the results showed that some practices were strongly used, while others were either only moderately or not used at all. This reflected in the ranking of the practices using the Relative Importance index (*RII*).

The respondents ranked the application of manure the highest (*RII*=0.916). This is because it's often cheaper and more sustainable for smallholder farmers compared to synthetic fertilizers. It also helps maintain soil fertility in the long term, rather than depleting it. This was followed by practices like intercropping (0.899), crop rotation (0.899), usage of improved cassava production technology (0.821), soil conservation techniques (0.795), adoption of climate resistance crop varieties (0.795), tillage and residue management (0.795), organic farming (0.622), integrated pest management (0.610), cover crop and green manure (0.556), irrigation and water management (0.556), and use of drought resistant crop varieties (0.556). Intercropping ranked 2nd and this shows that it is highly prioritized by the farmers, because it helps to mitigate risks associated with climate change and leads to food security and provide other sources of income. It ranked 1st in a study by Baffour-Ata et al. (2025).

The use of improved cassava production tech. ranked 4th, and this contradicts the assertion of Uzochukwu et al., (2021) that small scale farmers in Anambra state have not fully adopted improved cassava production technologies. The use of Agroforestry practices (0.222) was ranked very low (15 out of 16), and this aligns with the report of Chidozie et al., (2021) that the adoption of agroforestry practices among farmers is very low due to inadequate training on agroforestry practices. On the contrary, Baffour-Ata et al. (2025) ranked Agroforestry 5th amongst the 12 CSAPs utilized in Ghana. The finding of this further shows that the use of mulching and mixed farming were not prioritized by the farmers as they ranked 13 with an index of 0.382, and this disagrees with the finding of Igberi et al., (2022) who reported that mulching was adopted by over 130% of the farmers, and that of

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Baffour-Ata et al. (2025). Similarly, mixed farming was ranked 13th out of the 15 prioritized CSAPs in Baffour-Ata et al. (2025). Controlled flooding (0.219) was the least used (ranked 16) CSAPs in the area and this could be attributed to the choice of crop under study.

Table 3: CSAPs used by the farmers

Practice	*RII*	Rank
Application of manure	0.916	1
Intercropping	0.899	2
Crop rotation	0.899	2
Usage of improved cassava production tech	0.821	4
Soil conservation techniques	0.795	5
Adoption of climate resistant varieties	0.795	5
Tillage and residue management	0.795	5
Organic farming	0.622	8
Integrated pest management	0.610	9
Cover crop and green manure	0.556	10
Irrigation and water management	0.556	10
Use of drought resistant crops	0.556	10
Mixed farming	0.382	13
Mulching	0.382	13
Agroforestry	0.222	15
Controlled flooding	0.219	16

Source: Field survey, 2025. Note: RII=Relative importance index

Factors that determined the number of CSAPs used by the farmers

The factors that determined the number of CSAPs used by the cassava farmers are displayed in Table 4. The results of four functional forms of multiple regression analysis displayed in Table 4 show that the linear - linear functional form had a better result (more significant variables, and higher R^2), and, hence, was chosen as the lead result for this study. The overall significance of the regression analysis is ascertained by the significance of the F statistic (goodness of fit of the model) and the value of R^2 (0.812) which indicates that the listed variables explained up to 81% of the variations in the number of CSAPs used by the farmers.

The result, as displayed on table 4, clearly reveals that six variables (Age, years of experience, Number of extension visits, household size, access to credit, and awareness of CSAPs), out of the 11 variables examined were statistically significant. However, while age of the farmer and years of experience in cassava farming had negative effect on the number of CSAPs used, the remaining five variables (number of extensions visits in a season, household size, access to credit, and awareness of CSAPs) had positive effect. The coefficient of age (-0.116) is negative and statistically significant which means that as the age of the farmer increases the number of CSAPs used decreases. A coefficient of -1.116 means that for every increase in age, the number of CSAPs used decreases by approximately one. This implies that younger farmers have more tendency to use more CSAPs than older farmers. This finding corroborates that of Baffour-Ata et al. (2025) that age is inversely related to the use of CSAPs but differs with that of Gbadebo (2022) who found that age does not have significant relationship with adoption of CSAPs. Similarly, farmers' years of experience is a negative determinant of the number of CSAPs used by the farmers. An explanation to this could be that as farmers spend more years in cassava farming, they tend to be used to the practices that will lead to more output, hence, the tendency to have stable choices. The more years spent in cassava farming means more knowledge about the practices. Hence, the more experienced farmers may prefer established and less risky practices rather than experimenting on new ones. This agrees with Baffour-Ata et al. (2025) and further validates the finding of Gbadebo et al. (2022) who reported that farmers adopt climate smart technologies based on their experience in farming activities.

The result shows that for every visit by agricultural extension agents (3.415), the number of CSAPs used by the farmer increases by approximately three, while cassava farmers that had access to credit used two CSAPs more than those without access to credit. Gbadebo et al. (2022) had explained that cassava farmers who have access to credit facilities and extension services have the likelihood and tendency of obtaining relevant information required for climate adaptability and also purchase necessary inputs needed for utilization CSAPs. Extension agents create awareness and give relevant information to farmers. This research found that farmers who are aware of CSAPs will use more CSAPs than those who are not aware This further buttresses the relevance of extension services.

The coefficient of household size (4.692) was positive and significant indicating that any unit increase in household size will increase the farmer's use of CSAPs by four. This result is in consonance with Uduma and Nwaobiala (2024) who affirmed that large households have the advantage of more access to free household labour for farm activities than those with small household sizes. The implication of this is that large households can afford to use more CSAPs than small households since the household members will supply the needed labour.

The sex of the farmer, number of years spent in school, marital status, membership of co-operative group, and land ownership had no significant effect on the number of CSAPs used by the farmers. This contradicts the findings of Gbadebo et al. (2022), Sango et al. (2023) and Olabisi et al. (2023) that sex, education and cooperative membership significant determinants of usage of CSAPs.

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Table 4: Determinants of the number of CSAPs used by the farmers

VARIABLE	LIN LIN	LIN LOG	LOG LIN	LOG LOG
Sex	0.661 *(0.458)*	-1180.06 (-0.326)	0.092 *(0.114)*	-0.044 (-0.317)
Age	-1.116** *(-2.004)*	146.14 (1.138)	-0.091 *(-0.712)*	0.127 (0.646)
Years in school	79.612 *(0.441)*	-4483.04 (-0.678)	0.087 *(0.657)*	-0.090 (-0.461)
Marital status	1.039 *(1.410)*	-195.43 (-0.141)	0.021 *(1.534)*	0.037 (-1.455)
Years of Experience	-0.922*** *(-3.107)*	-27.32*** (-3.307)	-0.063 *(-0.307)*	0.415** (1.982)
Membership of Cooperative	31.394 (1.404)	25.345 (1.567)	1.331 (1.345)	0.091 (1.424)
Number Extension visits	3.415*** (3.11)	8.329** (1.992)	0.359 *(1.009)*	0.447 (0.993)
Household size	4.692*** *(2.912)*	3741.21** (2.213)	0.074** *(2.415)*	0.011** (2.006)
Land ownership	2.062 *(0.226)*	58.66 (1.111)	0.812 *(0.312)*	0.661 (1.008)
Access to agric credit	2.219*** *(4.982)*	19.38*** (3.450)	0.555*** *(3.459)*	0.216*** (3.134)
Awareness	1.999** *(2.729)*	-178.63 (-1.307)	0.007** *(2.002)*	-0.052** (1.996)
Constant	16.49*** (3.113)	-28.418** (2.516)	0.515** *(2.150)*	1.963** (2.011)
R^2	0.812	0.726	0.699	0.701
F stat	51.44***	11.33	32.00***	4.18***
DW	1.99	1.84	1.89	1.67

Source: Field survey 2025. Note: *** means significant at 1%; **=significant at 5% while *= significant at 10%.

Constraints to the Utilization of CSAPs

The constraints to the utilization of CSAPs are displayed on Table 5. The output of the results from a 5-point Likert scale, shows that inadequate finance is a very significant constraint to the utilization of CSAPs. The farmers complained that they are aware of most of the practices but they are very expensive to carry out and they will be willing to adopt them if they were a little bit affordable. Poor government support, high agrochemical cost, access to loan, scarcity of farmland, unfavorable market conditions, small landholdings, high labor cost, high cost of fertilizer, market unavailability, lack of knowledge, poor markets facilities, inadequate extension services, poor storage facilities and lack of updated information are also significant constraints to the utilization of CSAPs. Most of these are in line with the assertion of Onubogu, (2021) that inadequate extension services and lack of knowledge are the main reasons for the low utilization level of several CSA technologies.

This report was also in line with the report of Igberi et al (2022) who stated that lack of access to updated information and lack of access to micro finance and insurance were extremely serious gaps in the adoption of CSAPs.

Table 5 further shows that lack of trust in the effectiveness of CSAPs, communication gaps among farmers, and low soil fertility were considered not significant as they were no constraints to the utilization of CSA. This is in contradiction to the report of Ayush et al., (2024) who revealed that the communication gaps among farmers and lack of trust are serious social-personal constraints to the adoption of CSAPs faced by respondents.

Table 5. Constraints to the utilization of CSAPs

Constraint	Mean	Position	Decision
Inadequate finance	4.8	1st	SC
Poor Government support	4.3	2nd	SC
High agro-chemical cost	4.2	3rd	SC
Access to loan	3.9	4th	SC
Scarcity of farmland	3.7	5th	SC
Unfavourable market conditions	3.7	5th	SC
Small land holdings	3.7	5th	SC
High labour cost	3.7	5th	SC
High cost of fertilizer	3.6	9th	SC
Market unavailability	3.4	10th	SC
Poor market facilities	3.4	10th	SC
Lack of knowledge	2.7	12th	NSC
Inadequate extension service/communication gaps	2.7	12th	NSC
Poor storage facilities	2.7	12th	NSC
Lack of trust	2.6	15th	NSC
Low soil fertility	2.3	16th	NSC

Source: Field survey, 2025; Note: SC=serious constraint; NSC=not a Serious Constraint. Any constraint with a mean score of 3.0 or above means that such is serious constraint, but otherwise if <3.0.

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Conclusion

The socio-economic profile of cassava farmers in Anambra state suggests a potential for high adoption of innovative practices, given their literacy, active age, and experience. However, their part-time status and small landholdings may limit the scale of adoption. Farmers are highly aware and have a strong perception of CSAPs, particularly recognizing the benefits of practices like intercropping, which serves as a direct risk mitigation strategy against climate variability. The number of CSAPs used by the farmers were determined by some socio-economic characteristics of the farmers, while the major hindrance to widespread utilization of CSAPs hinges on financial constraints.

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