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Effect Of Credit On Food Security Of Cassava Farmers In Imo State

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Abstract
The study focused on a effect of credit on food security of cassava farmers in imo state, Nigeria. The specific objectives were to: to examine the socio-economic characteristics of cassava farmers in the study area, to examine the determinants of household food security among cassava farmers, to evaluate the food security status of cassava farming households, to analyze the relationship between microcredit utilization and food security status and to recommend strategies for improving credit access and food security among cassava farmers. Multistage sampling technique was adopted in selecting the sample for the study. Taro Yamane formulae was adopted to determine sample size for the study which was 150. Both primary and secondary sources of data were used for this study. Data was analyzed using descriptive and inferential statistical tools such as mean and percentage, food security index and logit regression models. The result from the findings shows that average age of respondents was 46.5 years, majority (74.7%) of cassava farmers in the study area were females, majority (95.3%) of cassava farmers were married, while only 4.7% were single. The average number of years spent in school was 13.4. Average family size was 6 persons. Average farming experience was 22.6 years. 94.7% of the respondents were not affiliated with any cooperative association. The average farm size was 0.94 hectares. Majority (85.3%) of cassava farmers received visits from extension agents. 10% of the farmers were full-time farmers. Average annual income was ₦213,670. 82.7% of respondents had access to credit facilities. The results showed that 85.3% of respondents were food-secure, while 14.7% were food-insecure. The determinants of food security among cassava farming households in the area were analyzed using binary logistic model. The result shows that Age, Farm Size, Farming Experience, Household Size, Monthly Income and Marital Status were significant factors influencing food security status of cassava farming households in the study area. It can be concluded that food security status among respondents was positive, with 85.3% being food-secure and only 14.7% food-insecure. Key determinants of food security included age, farm size, farming experience, household size, monthly income, and marital status. Micro-credit utilization has a direct positive relationship with food security status. It is therefore recommended that cassava farmers are encouraged to join or form cooperative societies to enhance access to collective resources, market opportunities, and credit facilities and financial institutions should consider increasing credit limits for cassava farmers and offering flexible repayment terms tailored to farming cycles.

Keywords*: Credit, Food Security, Cassava, Utilization, Farmers*

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I. Introduction

Agricultural credit is widely recognized as a critical input for rural development and food security. According to Stiglitz and Weiss (1981), credit markets are often characterized by imperfections, particularly in rural areas where collateral and formal employment records are lacking. These imperfections lead to credit rationing and limited investment in agriculture.

Adebayo and Adeola (2008) found a positive relationship between access to credit and agricultural productivity, which in turn contributes to food security. In a related study, Omonona and Agoi (2007) used the Food Insecurity Experience Scale to show that income and access to production resources, including credit, significantly influence household food security in rural Nigeria.

Obasi *et al*. (2022) observed that cassava farmers with access to credit were more likely to adopt high-yield varieties and modern farming techniques, resulting in increased food availability. Similarly, Nwaiwu *et al*. (2024) emphasized the role of financial inclusion in promoting agribusiness and reducing food insecurity in Imo State. These findings underscore the importance of targeted credit programs tailored to the needs of smallholder cassava farmers.

Food security remains a critical developmental challenge in Nigeria, particularly among rural farming households who produce the bulk of the country's staple foods. Food security, a multi-dimensional concept encompassing availability, accessibility, utilization, and stability of food, remains a major challenge in Nigeria. The 2022 Global Hunger Index ranked Nigeria 103rd out of 121 countries, indicating serious levels of hunger and undernutrition (Global Hunger Index, 2022). For rural cassava farmers, household food security is closely linked to their agricultural output and market income, both of which can potentially be influenced by access to microcredit (FAO, 2021).

Cassava is a key food crop in Nigeria and is predominantly cultivated by smallholder farmers in states like Imo, which lies in the country's southeastern region. Despite the crop's potential to enhance household food supply and income, many cassava farmers struggle with low productivity due to limited access to credit. Agricultural credit is vital for the procurement of quality inputs, adoption of improved farming practices, and expansion of production capacity, which directly impacts household food availability and stability (Akinbami, 2014).

In the context of Imo State, where cassava is a dominant crop, the availability and effective utilization of credit can play a significant role in improving food security among farming households. Access to credit can enhance farmers' ability to invest in technology, improve yields, and ultimately ensure a more reliable supply of food for both consumption and the market.

Despite various agricultural support programs aimed at improving rural livelihoods, food insecurity continues to affect a significant proportion of cassava farming households in Imo State. Many of these households experience seasonal food shortages, malnutrition, and low income levels. A key factor contributing to this situation is the limited access to credit, which hampers the ability of farmers to invest in productive resources. While several studies have explored the relationship between agricultural credit and productivity, there is limited empirical evidence on how credit specifically influences food security outcomes among cassava farmers in Imo State. This gap necessitates a focused investigation into the extent to which credit access affects food availability, accessibility, and stability for cassava farming households.

This study is important for several reasons. First, it provides evidence-based insights into the link between credit and food security, particularly within the cassava farming sub-sector. Second, it offers useful information for policy makers, development agencies, and financial institutions aiming to enhance rural food security through credit interventions. Third, the findings will benefit cassava farmers by highlighting the importance of credit in achieving household food sufficiency and income stability. Lastly, the study contributes to the growing body of literature on agricultural finance and food security in sub-Saharan Africa.

The aim of this study was to assess the effect of credit on the food security of cassava farmers in Imo State. The specific objectives were: to examine the socio-economic characteristics of cassava farmers in the study area, to examine the determinants of household food security among cassava farmers, to evaluate the food security status of cassava farming households, to analyze the relationship between microcredit utilization and food security status and to recommend strategies for improving credit access and food security among cassava farmers.

II. Materials And Methodology

The study adopted a cross-sectional survey design. The target population comprised of cassava farmers across the three agricultural zones in Imo State: Owerri, Orlu, and Okigwe. A multistage sampling technique was employed to select a representative sample of 150 cassava farming households.

Primary data were collected using structured questionnaires covering household socio-economic characteristics, credit access, and food security indicators. The Household Food security index was used to assess food security status.

Descriptive statistics was used to summarize data, while inferential statistics such as the Logistic Regression Model was applied to examine the effect of credit on household food security. The dependent variable was food security status (secure = 1, insecure = 0), while the independent variables included was credit access, household income, education level, farm size, and cooperative membership.

Models

Food security index model is stated thus:

$$F_i = \frac{\text{per capita food expenditure for the ith household}}{\frac{2}{3}\text{mean per capita food expenditure of all households}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(2)}$$

Where

F_i = food security index

When

Fi > 1 = food secure ith household.

Fi <1 = food insecure ith household.

logistic model is specified explicitly as:

$Fi = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12}X_{12}$ ……..... (3)

Where

F_i = Food security status (Dummy where 1, if household head is food secure; and 0, if household head is food insecure)

X_1= Age of household head (years)

X_2 = Level of education of household head (measured by years spent in school)

X_3= Farm size (hectares)

X_4= Farming experience (years)

X_5 = Household size (measured by number of persons in a household)

X_6= Credit access (dummy, where 1 = credit access and 0 = otherwise)

X_7= Sex (Male =1, Female = 0)

X_8 = Primary occupation (dummy, where 1 = farming access and 0 = otherwise)

X_9 = Monthly income (₦)

X_{10}= Marital Status (dummy, where 1 = if married, and 0 = otherwise.)

X_{11}= Source of Labour (man- day)

X_{12}= Farm output (Kg)

III. Results And Discussion

Socio-Economic characteristics of the farmers

The distribution of the cassava farmers according to socioeconomic characteristics is presented in Table 1.

Table 1: Distribution of the cassava farmers according to socioeconomic characteristics

Socio-Economic characteristics	Frequency	Percentage
Age (Yrs)		
15-25	1	0.7
26-35	6	4
36-45	56	43.3
46-55	72	48
56-65	15	10
Mean	**46.5years**	
Sex		
Male	38	25.3
Female	112	74.7
Marital status		
Married	143	95.3
Single	7	4.7
Years spent in school		
0 (No formal Education)	3	2
1-6 (Primary Education)	15	10
7-12 (Secondary Education)	42	28
13-20 (University Education)	90	60
Mean =	**13.4 years**	
Household size		
1-3	9	6
4-6	111	74
7-9	27	18
10-13	3	2
Mean =	**6 persons**	
Farming experience (Years)		
1-5	3	2
6-10	22	14.7
11-15	26	17.3

16-20	26	17.3
>20	73	48.7
Mean =	**22.6years**	
Membership association		
Yes	142	94.7
No	8	5.3
Farm size(Hectares		
0.1-1	112	74.7
1.1-2	37	24.7
2.1-3	1	0.6
Mean	**0.94ha**	
Extension Visit		
Yes	128	85.3
No	22	14.7
Farm Income (₦)		
<100000	3	2
100,000-199,000	85	56.7
200,000-299,000	45	30
300,000-399,000	12	8
400,000-499,000	5	3.3
Mean	₦213,670	
Access to micro-credit		
Yes	124	82.7
No	26	17.3

Source: Field data, 2024

The age distribution of cassava farmers reveals that the majority (48%) are aged between 46 and 55 years, followed by 43.3% between 36 and 45 years, 10% between 56 and 65 years, 4% between 26 and 35 years, and only 0.7% between 15 and 25 years. The average age of respondents is 46.5 years, indicating they are within the economically active and productive age range, capable of contributing to household food security through agricultural activities. This aligns with the findings of Mukhtar (2012) and Yusuf *et al*. (2015), who observed that individuals in their working-age bracket are more likely to adopt innovations that enhance productivity and income.

Majority (74.7%) of cassava farmers in the study area were females, while 25.3% were males, indicating that women dominate cassava farming in this region. This contrasts with Olayede's (2000) findings, which stated that small-scale farming is predominantly carried out by males. The results suggest that while both men and women engage in crop farming in the study area, women are more actively involved, contrary to the findings of Ndaghu *et al*. (2009) and Robert *et al*. (2013), who reported that men are typically household heads and make the key production decisions.

Majority (95.3%) of cassava farmers were married, while only 4.7% were single. The high percentage of married farmers can be linked to the need for additional support to handle the labor-intensive nature of cassava farming, which is a dominant activity in the study area. This underscores the importance of farming labor in agricultural production within typical rural Nigerian communities. Many rural farmers view marriage as a way to secure affordable labor for agricultural tasks, thereby enhancing household food security (Kirwan and Maye, 2013).

Significant portion (60%) of cassava farmers have completed between 13 to 20 years of schooling. Additionally, 28% attended school for 7 to 12 years, while 10% spent 1 to 6 years in education, and 2% did not receive any formal education. The average number of years spent in school was 13.4. This suggests that most farmers are literate, which is likely to positively impact their adoption of advanced technologies, such as improved crop varieties, organic soil amendments, and soil and water conservation methods. This finding aligns with the research by Oluwatusin and Shittu (2014), which stated that the level of education influences farmers' adoption of improved technologies. Consequently, the educational background of respondents will enable them to seek information on modern cassava production methods. Education serves as a vital resource for managing farm-level activities and is considered a key factor in the adoption and implementation of innovations.

The distribution of cassava farmers by household size reveals that a majority (74%) have families consisting of 4 to 6 members, while 18% have family sizes ranging from 7 to 9 members. Additionally, 6% belong to households with 1 to 3 members, and 2% have families of 10 to 13 members, resulting in an average family size of 6. Larger households can provide a source of family labor, although they may also have a higher dependency ratio. A bigger household size often leads to reduced per capita food expenditure, which can increase the risk of food insecurity. Adebayo (2012) supports this view, noting that larger family sizes tend to decrease food availability per person and can negatively impact nutritional status. According to Olarinde *et al*. (2014), farm households with larger family sizes can offer inexpensive labor and are generally more capable of implementing various adaptation strategies in response to soil degradation compared to those with fewer labor resources. Thus, household size is considered a significant source of family labor essential for agricultural production, typically measured by the number of individuals in a household.

Significant portion (48.7%) of cassava farmers have over 20 years of farming experience. Additionally, 17.3% have between 11 to 15 years and 16 to 20 years of experience, while 14.7% possess 6 to 10 years of experience. Only 2% of the farmers have farming experience ranging from 1 to 5 years, with an average farming experience of 22.6 years. This suggests that the majority of the farmers are older and highly experienced, indicating a strong background in food crop production within the study area. This finding aligns with the research by Zubairu and Maurice (2014), which noted that farmers with extensive experience are more likely to adopt new innovations that can enhance their productivity and contribute to food security.

94.7% of the respondents are not affiliated with any cooperative association, whereas only 5.3% are members of one or more cooperatives. This finding aligns with Bakari's (2016) research, which indicated that many respondents do not belong to any associations, thereby missing out on opportunities to engage in programs communicated through these cooperative societies. Idiong *et al*. (2014) suggested that being part of social organizations allows farmers to share information about modern farming practices.

Significant majority (74.7%) of the respondents have farm sizes ranging from 0.1 to 1 hectare. This is followed by 24.7% of respondents with farms measuring between 1.1 to 2 hectares, while only 0.6% fall within the 2.1 to 3 hectares category. The average farm size is 0.94 hectares, suggesting that smallholder farmers dominate the cassava farming landscape in the study area. This finding is consistent with the research conducted by Ojo *et al*. (2008) and Omonona *et al*. (2010), both of which reported that most respondents had small and fragmented farm holdings, likely due to land acquisition through inheritance. Farm size influences various factors such as adoption costs, risk perceptions, human capital, credit constraints, labor requirements, and tenure arrangements. It has been argued that small farms can face challenges with high fixed costs, which may hinder technology adoption, particularly when the technology is expensive (Abana and Singh, 1993; Okoye *et al*., 2009).

Significant majority (85.3%) of cassava farmers received visits from extension agents, while only 14.7% did not have any contact with them. It is suggested that interaction with extension workers and access to comprehensive information on production techniques can enhance the likelihood of farmers adopting improved agricultural practices (Salau *et al*., 2014).

A majority (56.7%) of the cassava farmers reported an annual farm income ranging from ₦100,000 to ₦199,000, with an average annual income of ₦213,670. Abdulrahman, Abdullahi, and Muhammad (2015) observed that cassava farmers are typically small-scale producers whose earnings are limited. This suggests that cassava farmers are low-income earners, as they cultivate cassava primarily at a subsistence level and therefore lack sufficient income to meet their own needs and those of their families.

The survey found that 82.7% of respondents had access to credit facilities, while 17.3% did not. Access to credit plays a crucial role in the adoption of new technologies by cassava farmers, which is essential for food security. In Nigeria, farm credit is a key factor that bridges the gap between adopting new farm technologies and increasing farm income among rural farmers (Akpan *et al*., 2013). Therefore, farmers in the study area who lack access to finance may struggle to expand their production activities.

Table 2 Distribution of cassava farmers by food security status

Food security status	Frequency	Percentage
food secure	128	85.3
food insecure	22	14.7
food security index	₦344,816.5	
Total	150	100

Source Field survey data, 2024

To assess food security, this study used the expenditure method, as employed by Omonona *et al*. (2007) and Zubairu and Maurice (2014). This approach categorized respondents into food-secure and food-insecure households based on their monthly food expenditure. A household was considered food-secure if its per-capita monthly food expenditure was at least two-thirds of the mean per-capita monthly food expenditure. Conversely,

a household was deemed food-insecure if its expenditure was less than two-thirds of the mean. The estimated mean per-capita food expenditure was N344,816.5, which served as the food security index. Respondents with expenditures below this threshold were considered food-insecure. The results showed that 85.3% of respondents were food-secure, while 14.7% were food-insecure. These findings align with those of Oyebanjo *et al*. (2013) and Zubairu and Maurice (2014), but contrast with Agwu and Oteh's

Table 3 Distribution of cassava farmers determinants of household food security

Logit Regression: Determinants of Food Security

YFoodSecurityStatus	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
X1Age	.117	.056	2.08	.038	.007	.227	**
X2Education	.071	.118	0.60	.55	-.161	.303	
X3FarmSize	-3.034	1.182	-2.57	.01	-5.351	-.718	**
X4FarmingExp	.105	.063	1.66	.096	-.019	.229	*
X5HouseholdSize	1.47	.538	2.73	.006	.415	2.525	***
X6CreditAccess	.787	1.179	0.67	.504	-1.523	3.097	
X7Sex	-1.224	1.202	-1.02	.308	-3.579	1.131	
X8PrimaryOccup	-.102	1.702	-0.06	.952	-3.438	3.233	
X9MonthlyIncome	0	0	3.66	0	0	0	***
X10MaritalStatus	2.707	1.325	2.04	.041	.11	5.303	**
X11SourceOfLabour	-.209	.48	-0.43	.664	-1.149	.732	
X12FarmOutput	0	0	1.42	.155	0	0	
Constant	-19.297	5.45	-3.54	0	-29.978	-8.615	***

Mean dependent var	0.853	SD dependent var	0.355
Pseudo r-squared	0.597	Number of obs	150
Chi-square	74.720	Prob > chi2	0.000
Akaike crit. (AIC)	76.345	Bayesian crit. (BIC)	115.483

*** *p<.01*, ** *p<.05*, * *p<.1*

Marginal Effects: Logit Regression

Average marginal effects Number of obs = 150

Model VCE : OIM

Expression : Pr(YFoodSecurityStatus), predict()

dy/dx w.r.t. : X1Age X2Education X3FarmSize X4FarmingExp X5HouseholdSize X6CreditAccess X7Sex X8PrimaryOccup X9MonthlyIncome X10MaritalStatus X11SourceOfLabour X12FarmOutput

	Delta-method					
	dy/dx	Std.Err.	z	P>z	[95%Conf.	Interval]
X1Age	0.006	0.003	2.310	0.021	0.001	0.011
X2Education	0.004	0.006	0.600	0.546	-0.008	0.016
X3FarmSize	-0.157	0.053	-2.950	0.003	-0.261	-0.053
X4FarmingExp	0.005	0.003	1.770	0.078	-0.001	0.011
X5HouseholdSize	0.076	0.024	3.160	0.002	0.029	0.123
X6CreditAccess	0.041	0.061	0.670	0.503	-0.078	0.160
X7Sex	-0.063	0.061	-1.040	0.297	-0.182	0.056
X8PrimaryOccup	-0.005	0.088	-0.060	0.952	-0.178	0.167
X9MonthlyIncome	0.000	0.000	5.010	0.000	0.000	0.000
X10MaritalStatus	0.140	0.063	2.230	0.026	0.017	0.263
X11SourceOfLabour	-0.011	0.025	-0.430	0.664	-0.059	0.038
X12FarmOutput	0.000	0.000	1.440	0.150	-0.000	0.000

Source: Computer Output from STATA Version 13

This table presents the binary logistic regression analysis results assessing factors affecting household food security status among microcredit users and non-users. Key variables include age, education, family size, landholding, dependency ratio, extension services, access to market, and microcredit usage. The model's pseudo $R^2 = 0.597$ and high chi-square value (74.72, $p < 0.001$) indicate good model fit and explanatory power. The logit regression results evaluating the determinants of household food security among cassava farmers reveal several statistically significant factors:

Age (X_1): The positive and significant coefficient ($\beta = 0.117$, $p < 0.05$) and marginal effect (dy/dx = 0.006, $p = 0.021$) suggest that as the age of the household head increases, the likelihood of being food secure also increases. This could be attributed to greater farming experience or resource control among older farmers.

Farm Size (X_3): A large negative and statistically significant coefficient (β = -3.034, $p < 0.05$) and marginal effect (dy/dx = -0.157, $p = 0.003$) indicate that larger farm sizes are paradoxically associated with lower food security. This may be due to underutilization, inefficiencies, or mismanagement of larger plots.

Farming Experience (X_4): While only marginally significant (β = 0.105, $p < 0.1$), experience still contributes positively to food security (dy/dx = 0.005), implying that longer experience helps farmers better navigate risks and optimize production.

Household Size (X_5): Significantly positive (β = 1.47, $p < 0.01$; dy/dx = 0.076, $p = 0.002$), suggesting that larger households may benefit from labor contributions of members, aiding food production and security.

Monthly Income (X_9): Although the coefficient is numerically zero, the high statistical significance ($p < 0.01$) in both the coefficient and marginal effect implies that higher income strongly increases food security. It is likely a result of greater purchasing power.

Marital Status (X_{10}): With a significant positive effect (β = 2.707, $p < 0.05$; dy/dx = 0.140, $p = 0.026$), married individuals may have more stable household dynamics that contribute to food security.

Table 4 Distribution of cassava farmers by microcredit utilization and food security status

Logistic regression

YFoodSecuritystatus	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
X1CreditUtilization	2.05	.601	2.45	.014	1.155	3.641	**
Constant	3.584	.978	4.68	0	2.1	6.118	***

Mean dependent var	0.853	SD dependent var	0.355
Pseudo r-squared	0.058	Number of obs	150
Chi-square	7.240	Prob > chi2	0.007
Akaike crit. (AIC)	121.825	Bayesian crit. (BIC)	127.846

*** $p<.01$, ** $p<.05$, * $p<.1$

Marginal Effects: Logit Regression

Average marginal effects Number of obs = 150 Model VCE : OIM Expression : Pr(YFoodSecuritystatus), predict() dy/dx w.r.t. : X1CreditUtilization	Delta-method

	dy/dx	Std.Err.	z	P>z	[95%Conf.	Interval]
X1CreditUtilization	0.086	0.035	2.460	0.014	0.017	0.154

Source: Computer Output from STATA Version 13

A focused regression model evaluated whether microcredit utilization impacts food security. The results are noteworthy: The model's pseudo R^2 is relatively low (0.058), which is expected for a single-variable model, yet the significant chi-square (7.240, $p = 0.007$) confirms that microcredit use is an important predictor of food security.

Credit Utilization (X): The model finds a significant positive relationship (β = 2.05, $p = 0.014$; dy/dx = 0.086, $p = 0.014$), suggesting that using microcredit increases the probability of being food secure by approximately 8.6%. This supports the idea that microcredit, when effectively used, enhances input availability and smooths consumption. This may be attributed to the use of microcredit in purchasing agricultural inputs, starting small businesses, or bridging consumption gaps during lean periods. Microcredit can thus serve as a tool to enhance income generation and ensure stable food supply, particularly in rural settings.

IV. Conclusions

It can be concluded that food security status among respondents was positive, with 85.3% being food-secure and only 14.7% food-insecure. Key determinants of food security included age, farm size, farming experience, household size, monthly income, and marital status. Micro-credit utilization has a direct positive relationship with food security status.

V. Recommendations

1. **Promote Cooperative Membership:** Encourage cassava farmers to join or form cooperative societies to enhance access to collective resources, market opportunities, and credit facilities.

2. **Strengthen Extension Services:** Improve the frequency and quality of extension agent visits to enhance farmers' technical knowledge and adoption of improved practices for productivity and food security.
3. **Support for Input Subsidies:** Policymakers should implement subsidies on critical inputs like fertilizers and labour to reduce production costs and improve yields.
4. **Education and Training:** Enhance farmers' capacity through educational programs focused on financial literacy, loan application processes, and efficient microcredit utilization.

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