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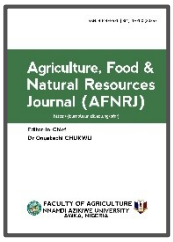

Original Article

Effects of financial inclusion on cassava productivity of smallholder cassava farmers in Rivers State, Nigeria

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ABSTRACT

This study assessed the effects of financial inclusion on cassava productivity of smallholder cassava farmers in Rivers State. Specifically, the study identified the financial inclusion products/services available in the study area, identified the providers of these products/services, and determined the effects of these products/services on cassava productivity. A multi-stage sampling procedure was used to sample 357 respondents; data were collected through structured questionnaires and analyzed using both descriptive and inferential statistics. The results showed that 68.1% of the farmers used only accounts and payment services offered by commercial banks and banking agents/POS operators that constituted 99.4% of the financial services providers in the study area. The financial inclusion variables considered in the study explained 23.9% of the variation in cassava output (R^2= 0.239). Credit (coefficient=0.323) and insurance (0.617) had positive and significant effects on productivity, while bank accounts (-0.140), investment (-0.138), and payment services (0.041) were not significant. The study concluded that financial inclusion has positive but limited effects on cassava output and that not all the financial inclusion services/products and providers were commonly available. Recommendations include educating farmers on impactful services, expanding product offerings by financial institutions, and providing incentives for establishing diverse financial service providers in rural areas.

KEYWORDS: *Accounts, Credit, Insurance, Investment services, Payment services*

INTRODUCTION

Cassava production in Nigeria in general and Rivers State in particular is predominantly undertaken by smallholder farmers characterized by cultivating small sizes of land areas (Adegbite *et al.*, 2021). Thus, their activities contribute to about 99% of total food outputs and inclusive growth as well as employment generation as they account for over 80% of all cassava farming activities in Nigeria (Fan *et al.*, 2020; Adegbite *et al.*, 2021). However, low productivity still remains a common experience among small holder cassava farmers in Rivers State with huge implications for their lives and that of the people living in the state. Majority of them still find it difficult to accumulate capital, use improved inputs, take advantage of better economic opportunities, build resilience to shocks, and adopt modern farming methods (Adams, 2018). They are mostly illiterate, low skilled and economically disadvantaged. Also, they usually lag behind in many areas of modern life, and their participation in socio-economic, socio-cultural, and political activities is low. The fear is that the achievement of food security will be jeopardized, as it is believed that the rising population of Nigeria will depend on small holder farmers for food security given that cassava productivity of smallholder farmers provides one of the sustainable ways of producing sufficient outputs of foods for the nation.

A link has been established between productivity and financial inclusion. Gershon *et al.* (1990) have observed that optimal

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input combinations leading to high productivity have been achieved by farmers who are financially included. They posited that farmers who are cash constrained due to financial exclusion cannot afford to use inputs at the optimal level which in turn affects output levels. Financial inclusion has been described as the process of making all adults have access to a wide range of formal financial products and services that meet their needs and at affordable costs (Central Bank of Nigeria (CBN), 2018). Financial inclusion efforts in Nigeria include the launching of the National Financial Inclusion Strategy (NFIS). This was later revised to pay particular attention to smallholder farmers among vulnerable groups because of their economic contributions (Sabo *et al.*, 2017; CBN, 2019). Others include know your customers regulations designed to achieve flexible accounts opening, and relaxation of transaction restrictions, National Identification Number (NIN) and, Biometric Verification Number (BVN), the Agents Banking Framework, the Cashless Policy, the Mobile Payment System and the establishment of linkages between commercial banks, government and microfinance bank for funding micro, small and medium enterprises (MSMEs) with the provision of various credits support schemes and programmes (Aro-Gordon, 2017; Adegbite *et al.*, 2021). Empirical studies have shown that financial inclusion has boosted the productivity of agricultural sector operators (Araba, 2020; Fowowe, 2020; Douglas *et al.*, 2021; Arowolo *et al.*, 2022; Ashoro *et al.*, 2024; Oloyo *et al..*, 2024). This is possible because financial inclusion empowers operators to raise sufficient funds from formal financial institutions to source high quality inputs, adopt best practices in crop cultivation, increase scale of operation and use modern farming techniques. However, current literatures have not sufficiently addressed how financial inclusion affects the cassava productivity of smallholder cassava farmers, especially in Rivers State, Nigeria.

Again, previous studies have addressed the supply side rather than the demand side of financial inclusion and have used more of secondary data than primary data. This study was therefore undertaken to investigate the effects of financial inclusion on cassava productivity of smallholder cassava farmers in Rivers State, approaching the study from the demand side. Specifically, this study identified the financial inclusion products/services available in the study area, identified the providers of these financial inclusion products/services and determined their effects on cassava productivity.

Knowledge of how financial inclusion affects cassava productivity is crucial for formulating effective policies and programmes.

MATERIALS AND METHOD

Study Area

This study was conducted in Rivers State, one of the states in the Niger Delta Region of Nigeria. The state lies at latitude 4^0 45'N and longitude 6^0 50' E. It is bounded to the north by Anambra and Imo states, to the west by Bayelsa and Delta states, and to the east by Abia and Akwa Ibom states. It occupies an area of 21,850 kilometers square with a population of 5,185,400 according to the 2006 National Census (Dibiaezue, 2025). The state has abundant fertile land, and rivers enabling the people to make a living from both fishing and farming. Major crops cultivated include cassava, yam, plantain, banana, and oil palm. There are 23 local government areas (LGAs) in Rivers State, divided into three agricultural zones based on the predominant agricultural activities. Zone 1(crop zone), Zone 2 (fishing zone) and Zone 3 (crop/livestock zone) (Rivers State Agricultural Development Programme, 2000). The study was conducted in 12 LGAs drawn from zones 1 and 3 because of the predominance of smallholder cassava farmers in these areas.

Data Collection

A multi-stage sampling method was used. In the first stage, 12 LGAs were purposively chosen from two agricultural zones due to the predominance of cassava farmers. In the second stage, the Taro Yamane formula was applied to determine the sample size from a total of 5029 registered cassava farmers in these areas (Rivers State Ministry of Agriculture.2024).

$$n = \frac{N}{1+N(e^2)} \quad (1)$$

Where N=5,029 and e =0.05, yielding a sample size of 357

In the third stage, the number of respondents per LGA was determined proportionally to the number of registered smallholder cassava farmers in that LGA. Finally, the fourth stage involved the random selection of the 357 respondents used for the study. Primary data were obtained with the help of structured questionnaire.

Data Analysis

Descriptive statistics (mean, frequencies and percentages) and inferential statistics (linear multiple regression model) were employed in the analysis of the data.

Linear multiple regression model.

Only products/services capable of impacting productivity at the smallholder farmers level were considered: credit utilization, accounts ownership, insurance utilization, investment services and fund payment services. The model is stated as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + u \quad (2)$$

Where: Y=cassava productivity (kg), X_1= credit utilization (Naira), X_2=accounts owned (number), X_3= insurance utilization (Naira), X_4= investment with financial services providers (Naira), X_5=payment services (number of transactions), u=the error term

RESULTS AND DISCUSSION

Financial Inclusion Products/services available in the Study Area

Table 1 showed that 180 respondents (50.4%) indicated that only accounts and payment products/services were available from the financial providers in their locations. According to 141 respondents (39.5%) accounts, credits, insurance and payment services were available. Only 36 respondents (10.1%) indicated accounts, payment and investment services only. These financial inclusion products/services fall amongst those identified in similar studies by Francisco (2017), Kalu *et al.* (2018) and Enhancing Financial Innovation and Access, (2014) as available in rural and urban areas where smallholder farmers are found. Account and payment services were the leading financial products/services indicated. These two services do not easily and significantly impact productivity when not associated with credit utilization. The implication is a low effect of financial inclusion on the productivity.

Also shown in Table 1 is that majority of the respondents (243, 68.1%) participated in financial inclusion through accounts and payments services only. This likely leads to low productivity and low income. Another 104 respondents (29.1%) participated through accounts, credits, insurance and payment services. 4 (1.1%) through patronizing accounts, payment and investment services only. 6 (1.7%) of the respondents participated through accounts, credits, insurance, payment and investment services. These findings agree with Demugue-kunt *et al.*, (2017) who found that having accounts, saving, investing, borrowing and having ATM cards can increase productivity.

Table 1: Financial inclusion products/services available in the study area

S/N	Financial products/services	Availability		Patronage	
		Freq.	%	Freq.	%
1	Accounts and payment services only	180	50.4	243	68.1
2	Accounts, credits, insurance and payment services	141	39.5	104	29.1
3	Accounts, payment and investment services only	36	10.1	4	1.1
4	Accounts, credits, insurance and payment and investment services			6	1.7
	Total	357	100	357	100

Field survey data, (2025)

Providers of Financial Inclusion Products/services in the Study Area.

Table 2 shows that 179 respondents (50.1%) indicated commercial banks as the providers of financial products/services (ranked first). Two respondents (0. 6%) indicated micro finance banks (ranked third). Banking agents and POS Operators were ranked second with 176 respondents (49.3%). These findings agree with Enhancing Financial Innovation and Access, (2014) which identified providers as the Central bank of Nigeria, deposit money bank, microfinance banks, and mobile money operators. The dominance of commercial banks and agents, which often do not easily grant credit to smallholder farmers suggests that access to credit will be difficult. Thus, farmers' use of credit in cassava production will be limited, and financial inclusion may not have a significant effect on productivity. This implies that smallholder cassava farmers in the study area may struggle to contribute reasonably to food security.

Table 2: Providers of financial inclusion products/services in the study area.

S/N	Providers of financial products/services	Freq.	%	Rank
1	Commercial Banks	179	50.1	1st
2	Micro Finance Banks	2	0.6	3rd
3	Banking Agents/POS Operators	176	49.3	2nd
	Total	357	100	

Field survey data, (2025)

Effects of Financial Inclusion on the Cassava Output of Smallholder Cassava Farmers.

Table 3 presents the regression results. The correlation coefficient (R) of 0.489 shows a weak and positive relationship between financial inclusion variables and cassava output. The coefficient of determination (R^2) was 0.239 meaning that 23.9% of variation in cassava output is explained by the included variables (credit, number of bank accounts, insurance, investment, payment services) The F-statistics (21.965, $p<0.01$) indicates that the overall model is statistically significant at 1% level.

The coefficients for credit utilization (0,323) is positive and significant ($p<0.01$). This suggests that an increase in credit utilization is associated with an increase in cassava productivity, consistent with Jimi *et al.* (2019), who found that credit-using small-scale farmers were on average 3% more productive than non-users. Credit increases financial resources for acquiring improved inputs and training.

The coefficient for insurance utilization (0.617) is positive and significant ($p<0.01$), consistent with Michael (2016) who found that insurance achieved increase productivity leading to sustainable development.

The coefficient for number of bank account (-0.140) is negative but not statistically significant ($p<0.240$). Therefore, no reliable evidence of a negative effect on productivity was found. This contradicts Fowowe (2020), who found savings had a positive significant impact. The finding here aligns with Noelia &

Tuesta (2017) and Songa (2012), who noted that farmers may own accounts but not use them for production purposes.

The coefficient for investment with financial service providers (-0.138) is negative but not significant (p=0.369). The coefficient for payment services (0.041) is positive but not significant (p=0.716). While not statistically reliable, the positive direction agrees with Hanning & Jansen (2010), who found positive impacts on daily financial transactions and productivity

Table 3. Effects of financial inclusion on the cassava output of smallholder cassava farmers.

Variables	Coef.	Std Error	t	Sig.
(Constant)	2.582	0.434	5.953	0.000
volume of credit	0.323	0.071	4.553	0.000
Number of bank accounts	-0.140	0.119	-1.177	0.240
Volume of insurance	0.617	0.146	4.238	0.000
Investment with financial Services providers	-.138	0.153	-0.899	0.369
level of payment services	.041	0.113	0.364	0.716
R	0.489			
R^2	0.239			
Adj. R^2	0.228			
F-statistics	21.965			

Field survey data, (2025). Coef. = Coefficients

CONCLUSION AND RECOMMENDATIONS

Financial inclusion had a statistically significant but limited effect on cassava productivity of smallholder cassava farmers in Rivers State. The financial inclusion variables included in the model explained 23.9% of the variation in cassava output. Credit and insurance had positive and significant associations with productivity, while accounts, investment and payment services were not statistically significant. Only a limited range of products/services and providers, mainly commercial banks and banking agents were available in the study area.

Based on these findings, the following recommendations are made:

i. Providers of financial inclusion products/service should educate and encourage smallholder cassava farmers to utilize services that have statistically significant effects on productivity, particularly credit and insurance.;
ii. Financial institutions operating in the area should expand their products/services offerings for the benefit of the farmers.
iii. Incentives should be provided to encourage the establishment of various categories of financial service providers in farmers' localities.

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Authors' Contributions

BRK handled all aspects of the study from conception to drafting of the final manuscript.

Ethical Statement

Not applicable

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