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# Access and usage of formal financial services among small-scale cassava farmers in Enugu state, Nigeria

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## *Abstract*

**Purpose:** Access to financial resources has been identified as one of the ways of boosting farm output, and this can be achieved through improving access to and usage of formal financial services. The study thus evaluated the effects of financial inclusion on cassava production among small-scale farmers in Enugu state, Nigeria.

**Methodology:** A multi-stage sampling technique was employed in the selection of 162 cassava farmers in Enugu State. The data collected were analyzed using descriptive statistics, multiple regression analysis, and Likert scale rating Technique.

**Finding:** Empirical results showed that the average of all respondents who participated in the survey was 43 years and 62.35% of the total respondents were males. Additionally, the result showed mean household size (4.75), mean years of cassava farming experience (5.86 years), and mean farm size (0.45 hectares). The majority (88.30%) of the farmers had access to a formal financial institution and the average amount saved in the last 12 months was ₦162,154.32. The multiple regression analysis showed that socioeconomic characteristics influencing cassava output are household, farming experience, farm size, farm income, and input cost. Additionally, financial inclusion positively influenced cassava output through access to formal financial institutions and level of savings.

**Originality:** The findings revealed the positive effect access and usage of formal financial services have on the economy. Therefore, the study recommends that farmers be encouraged to improve their usage of formal financial services such as improving their savings levels at banks and banks to reduce charges on formal financial services.

**Keywords:** financial inclusion, small-scale farmers, cassava production, access to formal finance, barriers to formal finance.

## *Nijerya'nın Enugu eyaletinde verimlilik için küçük ölçekli manyok çiftçilerinde resmi finansal hizmetlere erişim ve kullanımı*

## *Özet*

**Amaç:** Finansal kaynaklara erişim çiftlik üretimini artırmanın yollarından biri olarak tanımlanmıştır ve bu, resmi finansal hizmetlere erişimi ve kullanımını iyileştirerek elde edilebilir. Bu nedenle çalışma, Nijerya'nın Enugu eyaletindeki küçük ölçekli çiftçiler arasında finansal katılımın manyok üretimi üzerindeki etkilerini değerlendirmiştir.

**Metodoloji:** Enugu Eyaletindeki 162 manyok çiftçisinin seçiminde çok aşamalı bir örnekleme tekniği kullanıldı. Toplanan veriler tanımlayıcı istatistikler, çoklu regresyon analizi ve Likert ölçeği derecelendirme tekniği kullanılarak analiz edildi.

**Bulgular:** Ampirik sonuçlar, ankete katılan tüm katılımcıların ortalamasının 43 yaşında olduğunu ve toplam katılımcıların %62,35'inin erkek olduğunu gösterdi. Ek olarak, sonuç ortalama hane halkı büyüklüğünü (4,75), ortalama manyok çiftçiliği deneyimini (5,86 yıl) ve ortalama çiftlik büyüklüğünü (0,45 hektar) gösterdi. Çiftçilerin çoğunluğu (%88,30) resmi bir finans kuruluşuna erişebiliyordu ve son 12 ayda ortalama tasarruf edilen miktar ₦162.154,32 idi. Çoklu regresyon analizi, manyok üretimini etkileyen sosyoekonomik özelliklerin hane halkı, çiftçilik deneyimi, çiftlik büyüklüğü, çiftlik geliri ve girdi maliyeti olduğunu gösterdi. Ek olarak, finansal katılım resmi finans kuruluşlarına erişim ve tasarruf düzeyi yoluyla manyok üretimini olumlu yönde etkiledi.

**Özgünlük:** Bulgular, resmi finansal hizmetlere erişimin ve kullanımının ekonomi üzerinde olumlu bir etkiye sahip olduğunu ortaya koydu. Bu nedenle, çalışma çiftçilerin bankalardaki tasarruf seviyelerini artırmak ve bankaların resmi finansal hizmetlerdeki ücretleri azaltmak gibi resmi finansal hizmetlerin kullanımını iyileştirmeleri için teşvik edilmelerini önermektedir.

**Anahtar kelimeler:** finansal katılım, küçük ölçekli çiftçiler, manyok üretimi, resmi finansmana erişim, resmi finansmanın önündeki engeller.

## INTRODUCTION

Agricultural productivity is one of the major determinants of agricultural growth and economic growth at large (Fowowe, 2020). Agriculture was the largest contributor to the Gross Domestic Product (GDP) in Nigeria before the country's independence in 1960; the sector was the highest employer of labor, and also earned foreign exchange for the country (Ayanda and Ogunsekan, 2012). However, Nigeria's agricultural performance has been inadequate and significantly less than its potential. One of the major setbacks encountered in the agricultural sector, especially by the smallholder farmers in Nigeria is lack of access to finance (Afolabi, 2010; Ibrahim et al., 2023). Other challenges militate against these farmers' production activities such as: low farm gate prices, having little or no education, being mostly price takers, lack of land ownership rights and extension services leading to poor farm practices/performance and lack of adequate credit or finance (Al-Mustapha et al., 2021). However, majority of these challenges could be overcome through financial inclusion of farmers (Fowowe, 2020; Karerwa, 2023; World Bank, 2021). According to the EFInA (2023) report, many Nigerians for various reasons are unbanked. The majority of those who are fully excluded from formal financial services are rural dwellers whose primary source of livelihood is agricultural production. Studies done by Nwankwo and Nwankwo (2014) indicated that financial inclusion remains the factor that will determine the pace at which the financial access gap will be narrowed for the financially excluded in rural areas and concluded that the sustainability of financial inclusion in rural areas in Nigeria remains vital for agricultural and economic growth (Nwankwo and Nwankwo, 2024; Zins and Weills, 2016).

EFInA (2013) defined financial inclusion as the provision of a broad range of relevant and high-quality financial services and products like savings, credit, insurance, pensions, and payments, which are suitable and affordable for the entire population, particularly the low-income segment. Similarly, financial inclusion has been defined as the use of formal financial services as well as providing access to formal financial services, at an affordable cost to a large segment of vulnerable and low-income groups (De Koker and Jentzsch, 2012; Zins and Weills, 2016). The availability of financial services that meet the specific needs of the end users without discrimination is a major objective of financial inclusion (Olaniyi, 2017). This concept dwells on the access to and usage of financial services and products. It is thus a state in which the populace can access desired and appropriate formal financial products and services to enable them to manage their finance more effectively (Obisesan and Adeyonu, 2018). Access to financial services such as savings, credit, insurance, and pensions among others by small-scale farmers has the potential to enhance agricultural production, increase food security, and alleviate poverty (Mahendra, 2006). The importance of financial inclusion in agriculture is largely linked to the role of credit/finance in boosting agricultural production thus, leading to increased income, reducing poverty, and improved welfare in farming households (Abraham 2018; Yususf et al., 2019). Thus, financial inclusion is an important driver of agricultural and economic growth (Ibrahim et al., 2023; World Bank, 2021). Despite the ongoing financial sector growth in Africa, a significant number of individuals and firms still lack access to formal financial services in Nigeria. This gap in financial inclusion can be attributed to the poor understanding of how to use financial services, especially by the rural dwellers, insufficient capacity of financial service providers, and inadequate physical and financial infrastructures. Furthermore, the peculiar nature of agricultural production which characterizes it as a highly risky venture due to its high dependence on weather makes financial service providers hesitant to give loans to farmers. This is corroborated by the EFInA (2023) report on access to financial services (A2F) in Nigeria which states that the bankable adult population grew from 61% in 2016 to 74% in 2023. However, about 28.9 million adults representing 26% of the bankable adult population, are still financially excluded (EFInA, 2023). The report further stated that only 6% of the adult population obtained credit products through a regulated financial institution and 38% saved through a regulated financial institution. The majority of those who are financially excluded people are rural dwellers whose primary occupation is farming.

In Nigeria, many of the rural or small-scale farmers lack access to finance and thus, are highly financially excluded which has an adverse impact on their production activities and expansion potential (Mobio et al., 2021). Consequently, the production of notable staple food crops such as cassava has not been able to meet the high demand and generally lags behind the population growth rate (Chauvin et al., 2012). Cassava production is known for its important role in food security, alleviating poverty, and raw materials for agro-allied industries both in Nigeria and for exportation (IITA, 2022). Cassava provides food for a vast population worldwide and it is one of the most important foods in the diets of Africans. The crop is mostly grown by smallholder farmers on a subsistence scale, mainly for family consumption and sale in the local market. Cassava production is dominated by small-scale farmers who typically cultivate small expanses of land and lack access to resources like finance. Although Nigeria is notably the world's largest producer of cassava, the demand-supply gap continues to persist and worsen due to several reasons including poor access to finance. Inclusive finance of farmers is pivotal to promoting agricultural growth especially

as it enables the redistribution of financial resources from affluent urban areas to underserved rural areas thereby enhancing farmers' access to resources that facilitate technological advancements.

Statistically, results on trends of cassava production from FAOSTAT (2018) show an increase in the production of cassava in Nigeria from about 43 million tonnes in 2007 to 59.5 million tonnes in 2018. However, data from EFInA also suggests that there has been an increase in the level of financial inclusion over time (EFInA, 2023). Could this rise in the trend of cassava production be a result of the increase in financial inclusion level among rural cassava producers? This study thus seeks to address this gap in the literature by finding out if access to and usage of formal financial services by smallholder cassava farmers has any effect on production output. Additionally, the study measured the level of access and usage of formal financial services by cassava farmers, evaluated the effects of socioeconomic and financial inclusion factors on the output of the respondents, and also identified the barriers to farmers' financial inclusion in the area.

Previous studies have dealt with financial inclusion and economic development to determine the level of financial inclusion in the country as well as its effect on the economy (Bertram et al., 2016; Onalo et al., 2017; Nwidobie, 2019; Nwafor and Yomi, 2018; Olaniyi, 2017). These studies opined that financial inclusion is a crucial driver of economic growth and development. In agriculture, financial inclusion has been lined with market participation (Chukwudobelu et al., 2024), farmer's livelihood diversification (Adegbite and Machethe, 2022; Arowolo et al., 2022), and farm productivity (Fowowe, 2020; Obisesan and Adeyonu). This study is therefore motivated by the notion that several researches have been carried out about financial inclusion, but little or no available literature exists on the effect of financial inclusion on cassava production among small-scale farmers in Enugu state. The information collected through this study has the potential to be used in creating awareness of how barriers encountered in accessing financial services and products in the study area, could be addressed to mitigate them. Thus, this study will provide solid insights and provide farmers and other stakeholders with clues on how financial inclusion initiatives could boost production and help in the mitigation of possible production risks. Furthermore, this research will provide additional knowledge, hence contributing to the existing literature which will be useful as reference material to the different stakeholders.

## MATERIAL AND METHOD

### Study area

The study was carried out in Enugu state, Nigeria. This state is in the southeastern geo-political zone of Nigeria. Enugu state is located between latitude 5˚56′N and 7˚6′N and longitudes 6˚53′E and 7˚55′E of Greenwich Meridian (ENADEP, 2009). The state is bounded by Abia state to the South, Kogi and Benue states to the North, Ebonyi state to the East, and Anambra state to the West (Williams, 2008). The state is predominantly agrarian, with a greater proportion of its adult population engaged in agricultural production (Williams, 2008). The state has 17 Local Government Areas (LGA) and a landmass of approximately 8,022.95 km2 (Ezike, 1998). The state engages in the production of important cash crops such as cocoa, cassava, groundnut, rubber, and cotton. However, with the rising demand for food resulting from the population explosion (Jovanović, 1998); Enugu state as well as the rest of Nigeria, now imports food to meet the food deficit (Central Intelligence Agency (CIA), 2007).

### Sampling technique

A multi-stage sampling procedure was employed in the selection of cassava farmers in Enugu, State. In the first stage, four (4) agricultural zones were purposively selected based on the predominance of cassava farmers in the area with reference to the list obtained from Enugu State Agricultural Development Programme (ENADEP), they are: Agbani zone, Awgu zone, Enugu Ezike zone, and Nsukka zone. In the second stage, one Local Government Area was randomly selected from each of the four agricultural zones giving a total of four LGAs for the study. Thirdly, from each of the LGAs, three communities were randomly selected making a total of 12 communities. The last stage was the random selection of respondents from the communities. The respondents comprised of cassava farmers whose farm size were not beyond 2ha (≤ 2hecatares). To ensure that an adequate and representative sample was drawn at this stage, Yamane's (1967) formula was employed to ascertain the sample size from the known population figure obtained from Enugu State Agricultural Development Programme (ENADEP) in the table below using 95% confidence level and 15% error of margin.

***Table 1.*** *Sample size distributions*

| Agricultural Zones | Pop. size of cassava farmers | Confidence level % | Margin error % | Sample size |
|---|---|---|---|---|
| Agbani | 1237 | 95 | 15 | 42 |
| Awgu | 738 | 95 | 15 | 41 |
| Enugu Ezike | 511 | 95 | 15 | 40 |
| Nsukka | 394 | 95 | 15 | 39 |
| Total | 2880 | | | 162 |

Yamane (1967) formula is given as follows:

$$\boldsymbol{n = \frac{N}{1 + N \times e^2}}$$

Where;
n = the sample size
N = the target population
e = the level of precision
The total sample size for the study was 162 small-scale cassava farmers

**Data Collection and Analysis**

Data for the study were obtained from primary sources, interviews, and personal observation. Well-structured questionnaires were administered to the farmers. Both qualitative and quantitative information on relevant variables were obtained and these were centered on the socioeconomic and institutional characteristics, the farming activity, access to financial institutions, ownership of bank account, farm income generated, volume of loan obtained, timeliness of disbursement and, information on the Constraints to financial inclusion in the area. Data analysis was done using descriptive tools like frequency, percentages, and means, multiple linear regression, and Likert-scale.

The regression model employed to estimate the effects of various socio-economic and financial inclusion factors on the output of small-scale cassava farmers is specified as follows:

$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \ldots + b_nX_n + e$ (equation 1)

Where:
Y = Output of cassava in kg
$X_1$ = Years of education (years)
$X_2$ = Household size (number)
$X_3$ = Farming experience of farmers (years)
$X_4$ = Farm size (hectares)
$X_5$ = Farm Income (₦)
$X_6$ = Cost of input (₦) (cost of labor, fertilizer, herbicides, manure, rent and stem cuttings)
$X_7$= Access to formal financial institutions (bank account ownership; yes =1, No = 0)
$X_8$ = Transport cost to financial institutions in a month (₦)
$X_9$ = Accessed Loan from bank in the last 12months (accessed loan=1, otherwise = 0)
$X_{10}$ = Level of Savings with a bank in the last 12 months (₦)
$X_{11}$ = Access to Insurance Policy (dummy variable; yes = 1, No = 0)
$X_{12}$ = Have an insurance policy (dummy variable; yes = 1, No = 0)
e = error term

Three functional forms of the OLS model were fitted, and these include linear, semi-log, and double-log. The equation of best fit was selected based on the magnitude of $R^2$ and the statistical significance of the explanatory variables. The explicit forms of the functions are as follows:

Linear form: as specified in equation 1 above

Semi-log:

$\ln Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12}X_{12} + b_{13}X_{13} + \varepsilon$

Double log:

$1nY = b_0 + b_{11}nX_1 + b_{21}nX2 + b_{31}nX_3 + b_{41}nX_4 + b_{51}nX_5 + b_{61}nX_6 + b_7X_7 + b_{81}nX_8 + b_9X_9 + b_{10}X_{10} + b_{11}lnX_{11} + b_{12}X_{12} + b_{13}X_{13} + \varepsilon$

Barriers to financial inclusion were ascertained using a four-point Likert-scale rating using the following scales: Strongly agree (4), Agree (3), Disagree (2), and strongly disagree (1). The mean score of the respondent based on the four (4) point rating scale was computed as:

(4+3+2+1)/4=2.5

The cutoff point was 2.5. The respondent's mean score was then computed for each response item such that, mean scores of the response item below 2.5 were not regarded as barriers to financial inclusion while those with mean scores above 2.5 were regarded as barriers to financial inclusion in the study area.

## RESULTS AND DISCUSSION

**Socio-economic characteristics of the respondents**

The gender distribution of the respondents is presented in Table 2 below. It shows that a greater proportion (62.35%) of the respondents were males while 37.65% were females. This result is in line with the findings of other authors, who also pointed out the predominance of men in farming activities (Tambi, 2018; Obisesan and Adeyonu, 2018). The age of farmers is one of the major determinants of how active they are. The productivity of a farmer, all things being equal, is expected to increase with age as the farmer acquires more farming experience; although, when the farmer becomes old, productivity might tend to decline until she/he will no longer be able to farm (Atagher, 2013). The result of the findings showed that the mean age of the respondents was 43.32 years; this implies that the majority of the respondents were young and active age for cassava production. Age is an important factor in agricultural production especially in the rural areas because of the high dependence on human power for production activities. The marital status distribution of smallholder cassava farmers in the study shows that a majority (63.6%) of the respondents were married This result is related to the report done by Olaniyi et al. (2013) that married households tend to have relatively more labor to engage in farming activities. Level of formal education is a form of human capital development that increases labor productivity, which in turn, results in higher output. The result shows that 6.17% of the respondents had no formal education, while 93.83% had obtained some level of education. This aligns with findings from Obisesan and Adeyonu (2018) and supports the assertion that some form of formal education is essential to enable farmers communicate effectively with bank officials, especially during loan procurement procedures in formal financial institutions. Thus, one can also conclude that the majority of the farmers were literate enough to enable them to adopt technologies that could improve their production (Atagher, 2013).

Results on household size revealed that the average household size was approximately 5 persons. A large family size is important in rural farming communities give that the household members constitute the primary source of manual labor for production activities. The cassava farmers had average farming experience of 12.86 years which is an indication of the practical knowledge the farmers have gained in cassava production activities. A majority of the farmers primarily stated that farming is their major occupation and they have an average farm size of 0.45 hectares, thus indicating the small-scale nature of their farming activities. Many farmers according to Awotide et al. (2015), do not have adequate finance to acquire large farm land, so they are constrained to using small farms on which they can bear the costs of production. The small size of the land also could relatively be a result of the land tenure system. The average farm income from cultivating cassava in the last farming season was ₦67,018.52 indicating that the majority of the respondents are low farm-income earners. This supports the findings of Inoni (2009) who reported that majority of rural households earned low income. The results further family labor was the major (43.2%) labor source for farming activities thus underscoring the importance of large family size.

The mean cost of farm input for cassava farming in the last cassava farming season was ₦8,499.38. Many farmers used planting materials from previous harvests, operated on a small scale, made use of family labor, and employed crude methods of farming, hence spending a minimal amount as input cost for cassava production. The average cassava output from the respondents in the last farming season was 2.69 tonnes indicating a moderate yield

from the farm. Cassava yield could be as high as 16 tonnes of fresh tuber per hectare (Hauser et al., 2014; Ikuemonisan et al., 2018). However, this is dependent on the nature of reproduction.

***Table 2.*** *Socio-economic and institutional characteristics of small scale-scale cassava farmers*

| Socioeconomic characteristics | Frequency | Percentage | Mean |
|---|---|---|---|
| **Gender** | | | |
| Male | 101 | 62.35 | |
| Female | 62 | 37.65 | |
| **Age** | | | 43.32 |
| **Marital status** | | | |
| Married | 103 | 63.6 | |
| Single | 42 | 25.9 | |
| Widowed | 10 | 6.2 | |
| Divorced | 7 | 4.3 | |
| **Educational Qualification** | | | |
| No formal education | 10 | 6.17 | |
| Primary education | 114 | 70.37 | |
| Secondary education | 30 | 18.52 | |
| Higher education | 8 | 4.94 | |
| **Household Size** | | | 4.75 |
| **Cassava farming Experience** | | | 12.86 |
| **Major Occupation** | | | |
| Farming | 49 | 30.2 | |
| Trading | 63 | 38.9 | |
| Civil Servant | 9 | 5.6 | |
| Artisans | 23 | 14.2 | |
| Teaching | 18 | 11.1 | |
| **Farm Size** | | | 0.45 |
| **Farm income** | | | 67,018.52 |
| **Type of labor used** | | | |
| Hired | 53 | 32.7 | |
| Family | 70 | 43.2 | |
| Both Family and hired | 39 | 24.1 | |
| **Cost of Input** | | | 8,499.38 |
| **Cassava Output (tonnes)** | | | 2.69 |

**Level of access and usage of formal financial services**

Table 3 presents the level of financial inclusion based on the access to and usage of financial services by cassava farmers. The distribution of the farmers with respect to accessibility to formal financial institutions showed that 69.75% had access to formal financial institutions/banks while 30.25% did not. This implies that most of the farmers had at least a formal financial service within their reach. This is in agreement with the findings of Obisesan and Adeyonu (2018) who stated that the majority of arable crop farmers had access to formal financial institutions within their communities. Also, as shown in the table, the mean cost of transportation in a month by these farmers, from their residence to the nearest available financial institution, was ₦1812.96.

Additionally, the majority (75.3%) of the farmers had bank accounts 91.80% of the farmers that owned bank accounts, opened their accounts in a bank branch. The result aligns with the findings of Ibrahim et al. (2023) but contradicts the findings of Obisesan and Adeyonu (2018), who reported that 72.35% of arable crop farmers in Nigeria were not banked. The result further shows that despite being banked, majority of the farmers (85.2%) prefer to receive payment for their produce in cash. A greater proportion of the farmers (77.8% and 58.0%) of the farmers made cash payments for farm input and consumption expenses respectively. This suggests that although these farmers were banked, only a few use it as a means of payment.

The ownership of ATM/debit cards by the farmers showed that 67.28% of the farmers had ATM/debit cards while 89.91% of those who owned debit cards used the card to make transactions. This suggests that the presence of a formal financial institution increases access and technological innovation and can be a channel for achieving financial inclusion (Kalunda, 2014). From the table, it can be seen that the mean amount of savings by the farmers in the last 12 months was ₦162,154.32 and 42.59% of the farmers saved in the bank. This result is in contrast with the findings of Obisesan and Adeyonu (2018) who showed that only a few farmers save money in the bank.

In the past twelve months, the majority (85.2%) of the farmers did not access loans from the bank while only 14.8 % of the farmers, accessed loans from banks. This confirm the EFInA report (2023) which stated that only 6%

of adult population accessed credit despite owning a bank account. This is a result of cumbersome procedures in the procurement of loans, and a lack of collateral. Other reasons could include risk aversion for farmers who are afraid of going into debt, high interest rates on loans, and the reluctance of commercial banks to provide loans for small-scale agricultural activity (Arowolo et al., 2022). From the result, 33.3% of the farmers who accessed loans from the bank indicated that the loan was disbursed at the right time, while the remaining 66.7% indicated that the loan was not disbursed at the right time. This could impact agricultural production as the process is time-conscious. Late disbursement of a loan may defeat the purpose for which the loan was intended. The majority (54.2%) of the farmers who accessed loans from the bank used the loans for personal needs, while 20.8% of the farmers used the loans for farming. Diversion of loans has been a constraint in achieving the aim of agricultural credit schemes like the Nigerian incentive-based risk-sharing system for agricultural lending and the Anchor Borrowers Programme (Balana and Oyeyemi, 2022). Loans are often diverted to non-productive activities and thus, its expected impact on farm output is not achieved.

The result further showed that while 61.73% and 52.50% of the farmers were aware of insurance policies and had access to insurance respectively, only 5.5% of farmers had formal insurance policies. Similarly, Abdulmalik et al. (2013) reported a high level of awareness of the agricultural insurance scheme in the Federal capital territory, Abuja, Nigeria. However, EFInA (2023) reported only 3% of the adult population was covered by a regulated insurance policy. This implies that though the farmers in the study area might have heard of insurance schemes, they might not have adequate knowledge of the importance of having an insurance scheme and thus do not buy into the scheme.

***Table 3.*** *Level of access and usage of formal financial services*

| Financial inclusion parameters | Frequency | Percentage | Mean |
|---|---|---|---|
| **Access to Formal Financial Institutions(bank)** | | | |
| Access | 113 | 69.75 | |
| Non-Access | 49 | 30.25 | |
| **Transportation cost from residence to financial Institution/month** | | | 1812.96 |
| **Ownership of acct. with commercial bank** | | | |
| Have account | 122 | 75.3 | |
| Don't have an account | 40 | 24.7 | |
| **Medium for account opening** | | | |
| Bank Branch | 112 | 91.80 | |
| Agent banking | 8 | 6.56 | |
| Phone | 2 | 1.64 | |
| **Means of payment from cassava sales** | | | |
| Cash | 138 | 85.2 | |
| Bank deposit | 10 | 6.2 | |
| Mobile Transfer | 7 | 4.3 | |
| PoS | 7 | 4.3 | |
| **Means of payment for inputs** | | | |
| Cash | 126 | 77.8 | |
| Bank deposit | 15 | 9.3 | |
| Mobile Transfer | 16 | 9.9 | |
| PoS | 5 | 3.1 | |
| **Means of payment for consumption expenses** | | | |
| Cash | 94 | 58.0 | |
| Bank deposit | 38 | 23.5 | |
| Mobile Transfer | 19 | 11.7 | |
| PoS | 11 | 6.8 | |
| **Ownership of ATM/Debit card** | | | |
| Have debit card | 109 | 67.28 | |
| Don't have a debit card | 53 | 32.72 | |
| **Use a Debit card for payments/withdrawal** | | | |
| Use debit card | 98 | 89.91 | |
| Don't use a debit card | 11 | 10.09 | |
| **Amount saved in the past 12 months** | | | |
| Less than 100,000 | 85 | 52.47 | |
| 100,00 – 499,000 | 67 | 41.36 | |
| 500,000 – 999,000 | 8 | 4.94 | |
| 1,000,000 – 1,500,000 | 2 | 1.23 | 162,154.32 |
| **Means of savings** | | | |
| Bank | 69 | 42.59 | |
| Saving groups | 37 | 22.84 | |
| Home | 17 | 10.50 | |
| Cooperatives | 39 | 24.07 | |
| **Accessed loan from bank in the past 12months** | | | |
| Accessed | 24 | 14.8 | |
| Non-Access | 138 | 85.2 | |
| **Timeliness of loan disbursement** | | | |
| Timely | 8 | 33.3 | |
| Untimely | 16 | 66.6 | |
| **Use of loan** | | | |
| Farming | 5 | 20.8 | |
| Trading | 6 | 25.0 | |
| Personal needs | 13 | 54.2 | |
| **Knowledge of insurance policy** | | | |
| Aware | 100 | 61.73 | |
| Not aware | 62 | 38.27 | |
| **Access to insurance** | | | |
| Have access | 85 | 52.5 | |
| Don't have access | 77 | 47.5 | |
| **Own an Insurance policy** | | | |
| Have insurance | 9 | 5.5 | |
| Don't have insurance | 153 | 94.4 | |

**Effects of socio-economic and financial inclusion factors on cassava output**

The result of the socio-economic and financial inclusion factors affecting the output of small-scale cassava farmers is shown in Table 4 below. The lead equation is the linear functional form; the choice was based on the value of the coefficients of multiple determination ($R^2$), F- ratio, and level of significance of variables.

The coefficient of multiple determination ($R^2$ value of 0.839) shows that the explanatory variable in the model explained approximately 84 percent of the total variations in output of small-scale cassava farmers. The result of the analysis showed that seven out of thirteen explanatory variables had significant coefficients in the equation, they include; Household size, farming experience, farm size, farm income, cost of input, access to formal financial institution (ownership of bank), and level of savings in the last 12 months.

Household size was positive and significant at a $p<0.10$. This implies that cassava farmers with large households will likely have an increase in production output. Small-scale farmers often rely on family labor for production activities and thus, larger household sizes would provide more labor available to carry out production activities. This is in agreement with the findings of Awotide et al. (2015) and Akintayo et al. (2022) which concluded that household size positively influenced agricultural productivity

The coefficient of cassava farming experience was positively significant at $p<0.05$. This is in agreement with apriori expectations. This result implies that an increase in the years of cassava farming experience leads to an increase in the level of cassava output as the farmer will have a better knowledge of the production activities and make more effective management decisions. Similarly, Akintayo et al (2022) and Idumah et al (2020) attributed increases in farm output of farmers to their increased years of farming experience.

The coefficient of farm size was positive and significant at $p<0.01$ implying that higher farm sizes result in higher output of rice farmers. This result underscores the importance of land as a core resource for agricultural production. Similar findings were made by Adewuyi et al. (2024) and Ukwuaba et al. (2024) who stated that farm size was important in influencing output and market participation decisions among small-scale farmers.

Income was positive and significant at $p<0.01$, which agrees with apriori expectation. A positive significant coefficient implies that rising farm income increases the chances of having better output. Higher incomes offer farmers access to credit and allow farmers to better invest in technology that would increase efficiency and yield. Similar results have also been obtained across the world such as by Adeyemo and Bamire (2005) in Nigeria, Horioka and Junmin (2007) in China, and Kibet et al. (2009) in Kenya.

The coefficient of cost of input (-3.900E-5) was negative and statistically significant at a 5% probability level. This indicates that increasing input cost would decrease output since the farmer will incur higher expenditures in the procurement of farm input. Therefore, lower productivity and output are expected as a result. It thus corroborates the findings of Njoku and Odii (1991) that increasing the cost of input enhances less efficient use of resources by small-scale maize farmers in Nigeria.

Ownership of bank accounts had a significant and positive effect on cassava output at a $p<0.01$. This indicates that increasing the accessibility to financial services may increase the level of cassava output, as the farmers can access financial services such as agricultural credit, insurance schemes, etc., that would help enhance production activities. This aligns with the findings of Olaniyi (2017) and Fowowe (2020) who concluded that access to formal financial services stimulates agricultural productivity among farming households in Nigeria. Similarly, Herliana et al. (2018) stated that bank account owners are 3.66 times more likely to access credit which would be used to boost production and subsequently output.

The coefficient (1.009E-6) of level savings for the past 12 months was positively significant at $p<0.10$. This implies that the higher the level of savings of farmers the higher the disposable cash to invest in agricultural activities which leads to an increase in output. Similarly, Ksoll et al. (2016), Ribaj and Mexhuani (2021), and Karerwa (2023) emphasized the importance of deposits in influencing agricultural and economic growth. This is because of the importance of savings in stimulating output, investment, and financial buffer for better risk management.

***Table 4.*** *OLS regression analysis of socio-economic and financial inclusion factors affecting output of small-scale cassava farmers in Enugu State, Nigeria.*

| Explanatory variables | Linear | | Double-log | | Semi-log | |
|---|---|---|---|---|---|---|
| | Coefficient | t ratios | Coefficient | t ratios | Coefficient | t ratios |
| Constant | 1.009 | 4.793 | -0.289 | -0.228 | 1.415 | 0.227 |
| Years of education | 0.008 | 1.236 | 0.007 | 0.524 | 0.028 | 0.449 |
| Household size | 0.026 | 1.938* | -0.034 | .848*** | 0.125 | .643** |
| Cassava farming experience | 0.12 | 2.812** | 0.040 | 1.428 | 0.181 | 1.303 |
| Farm size | 0.874 | 8.528*** | 0.063 | 0.621 | 0.348 | 0.696 |
| Farm income | 4.796E-6 | 6.784*** | 0.061 | .576*** | 0.100 | 0.190 |
| Cost of input | -3.900E-5 | -2.427** | 0.023 | 0.090 | -0.327 | -0.259 |
| Ownership of bank account with | 0.330 | 3.384*** | 0.118 | 0.363*** | -0.657 | -0.411 |
| Cost of access to financial services | -2.740e-5 | -0.970 | -0.133 | -1.017 | -0.608 | -0.948 |
| Cost of access to financial service | -2.740E-5 | -0.970 | -0.133 | -1.017 | -0.608 | -0.948 |
| Level of savings | 1.009e-6 | 5.999*** | 0.044 | 0.368 | 0.516 | 0.875 |
| Accessed loan from a commercial bank | 0.490 | 0.857 | 0.046 | 1.178 | 0.231 | 1.197 |
| Access to insurance policy | 0.028 | 0.655 | 0.192 | 1.198 | 0.797 | 1.011 |
| Have insurance policy | 0.519 | 0.941 | 0.044 | 0.368 | 0.516 | 0.875 |
| R Squared | 0.839 | | 0.768 | | 0.704 | |
| Adjusted R square | 0.779 | | 0.717 | | -0.689 | |
| F- value | 96.441*** | | 76.543** | | 54.992 | |

Note: *, **, *** indicates 10%, 5% and 1% level of significance

**Barriers to financial inclusion among small-scale cassava farmers**

To understand the barriers to Financial Inclusion among small-scale Cassava farmers in Enugu State, Nigeria, the four-type Likert scale rating technique was used. The average scores are presented in Table 5. The result shows that the farmers highly rated six variables as constraints limiting them from being more financially included.

The most significant constraint was unstable income from farmers. Most agricultural production is seasonal in nature and thus, income flow is unsteady. Thus, while farmers may have access to formal financial services, their usage of these services such as making deposits may be low, especially in periods of low or no sales. This constraint is consistent with the report of EFInA (2023) report which stated that the majority of the adult population were excluded due to lack of sufficient funds and irregular income. The proportion of the adult population reporting this constraint increased from 31% in 2020 to 49% in 2023.

The farmers also reported high charges that are attracted to using formal financial services. These may include maintenance charges, interest on loans, transfer charges, and others that are often monthly deducted. These may deter farmers from being financially included. Chukwulobelu et al. (2024a) and Chukwulobelu et al. (2024b) similarly identified high-interest charges as a major constraint hindering farmers from being financially included.

The farmers also reported a lack of trust in banks as they feared they were unreliable, accounts could easily get hacked or banks may declare bankruptcy. Similarly, Obisesan and Adeyonu (2018) revealed that arable crop farmers in Southwest Nigeria expressed fear of insolvency by the banks are were thus unwilling to risk their funds by depositing at the bank.

Additionally, the farmers reported their preference in using other types of institutions asides banks. This aligns with findings of Nwambeke et al. (2016) and Obisesan and Adeyonu (2018) who stated that farmers often used cooperatives and savings groups as a means of savings and obtaining credit as it was more accessible to them and required less rigorous processes.

Lengthy documentation process for account opening or resolving issues in the banks also deters farmers from being financially excluded. This aligns with the findings of Chukwuodobelu et al. and Ugwujah and Attah (2020) who emphasized how time consuming it is to resolve banking issues especially on days where there are long queues. Low interest on deposits was also identified as a constraint to financial inclusion by the farmers. Thus, farmers see no incentive to deposit their money in banks.

***Table 5.*** *Barriers to financial inclusion among small scale cassava farmers.*

| Financial inclusion barrier Parameters | 4 | 3 | 2 | 1 | Mean | Standard deviation |
|---|---|---|---|---|---|---|
| Don't have a stable income | 52(32.1) | 68(42.0) | 27(16.7) | 15(9.3) | 2.97* | 0.929 |
| The charge/interest for using a formal account is too high | 8(4.9) | 116(71.6) | 21(13.0) | 17(10.5) | 2.71* | 0.720 |
| Lack of trust in banks | 52(32.1) | 38(23.5) | 34(21.0) | 38(23.5) | 2.64* | 1.162 |
| Prefer to use other types of institutions aside from banks | 39(24.1) | 42(25.9) | 62(38.3) | 19(11.7) | 2.62* | 0.978 |
| Lengthy documentation/ protocols | 36(22.2) | 48(29.6) | 58(35.8) | 20(12.3) | 2.62* | 0.966 |
| Low interest on deposits | 44(27.2) | 29(17.9) | 57(35.2) | 32(19.8) | 2.52* | 1.093 |
| Far distance to financial service providers | 36 (22.2) | 14(8.6) | 79(48.8) | 33(20.4) | 2.33 | 1.039 |
| Don't know how to go about opening an account | 42(25.9) | 30(18.5) | 56(34.6) | 34(21.0) | 2.49 | 1.093 |
| No financial service provider nearby | 17(10.5) | 75(46.3) | 27(16.7) | 43(26.5) | 2.41 | 0.994 |
| Uninterested in having an account | 14(8.6) | 67(41.4) | 20(12.3) | 61(37.7) | 2.21 | 1.048 |
| Not allowed to open an account by spouse/family | 23(14.2) | 54(33.3) | 45(27.8) | 40(24.7) | 2.37 | 1.009 |
| Lack of collateral | 14(8.6) | 82(50.6) | 20(12.3) | 46(28.4) | 2.40 | 0.993 |
| Lack of information on financial products and services | 37(22.8) | 20(12.3) | 32(19.8) | 73(45.1) | 2.13 | 1.217 |
| Lank of identification requirements | 36(22.2) | 19(11.7) | 31(19.1) | 76(46.9) | 2.09 | 1.215 |

Strongly agree =4, agree=3, disagree=2, agree=1

# CONCLUSION

Financial inclusion is a major approach that can be used by policymakers to strengthen the production capacity of rural poor farmers and enhance their resilience during farming crises. This paper explored the effect of financial inclusion on the production of cassava among small-scale farmers with a view of assisting these farmers, who are the mainstay of Nigeria's agricultural economy. The result showed that while farmers had access to formal financial services and a significant proportion of farmers were banked, the usage of these financial services were relatively low. The results of the OLS multiple regression analysis showed that educational level, household size, farm size, farm income and cost of input, ownership of bank accounts, and level of savings in the last 12 months were significant factors that influenced cassava output. Furthermore, farmers identified the lack of stable income, high bank charges, low interest on deposits, lack of trust in banks, and lengthy documentation as the barriers that prevent them from enhancing their access to and usage of formal financial services.

Based on the findings the study thus recommends the following:

i. Farmers are encouraged to improve their usage of formal financial services such as improving their savings levels at the banks. This could motivate banks to increase their lending capacity to farmers thus improving their access to credit to aid production activities and increase output.

ii. Banks are encouraged to review the charges and other maintenance fees on deposits as this could discourage farmers from using formal financial services

iii. The government should encourage and make directives to facilitate the process of obtaining loans. More so, these loans should be disbursed on time to ensure effective utilization in farming activities.

iv. Formal financial institutions should be made more accessible to farmers, especially in rural areas. In situations where physical banks may not be made available, mobile bank agents may be deployed to these rural areas to serve their needs and facilitate access to financial institutions.

**Contribution Rate of Researchers Declaration Summary**

The authors declare that they have contributed equally to the article and have not plagiarized.

**Conflict of Interest Declaration**

The authors of the article declare that there is no conflict of interest between them.

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