



(RESEARCH ARTICLE)



## EFFECTS OF MICROFINANCE SERVICES ON THE PERFORMANCE OF SMALL HOLDER RICE (*ORYZA SATIVA*) FARMERS IN TARABA STATE, NIGERIA

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### ABSTRACT

This study examined the effect of microfinance services on the performance of smallholder rice farmers in Taraba State, Nigeria. Specifically, the study described the socio-economic characteristics of the respondents, examined the effect of microfinance services on farmers' performance, and identified the constraints faced in accessing credit from microfinance banks. A multi-stage sampling technique was employed to select 384 smallholder rice farmers for the study. Primary data were collected using questionnaires and analysed using descriptive statistics and multiple regression analysis. The results showed that the respondents were predominantly male (76.0%) and married (78.4%), with a mean age of 44 years, mean farm size of 2.24 ha, mean household size of 7 persons, and mean annual farm income of ₦1,087,650. The double-log model was selected as the lead equation based on its superior econometric properties ( $R^2 = 0.781$ , Adjusted  $R^2 = 0.777$ ,  $F = 265.71$ ,  $p < 0.01$ ). The findings revealed that annual farm income, microcredit, micro-savings, and agricultural insurance had positive and significant effects on the performance of smallholder rice farmers, while interest rate had a significant negative effect. The findings revealed that annual farm income ( $\beta = 0.462$ ;  $p < 0.01$ ), microcredit ( $\beta = 0.214$ ;  $p < 0.01$ ), microsavings ( $\beta = 0.136$ ;  $p < 0.05$ ), and agricultural insurance ( $\beta = 0.071$ ;  $p < 0.10$ ) had positive and significant effects on the performance of smallholder rice farmers, while interest rate ( $\beta = -0.184$ ;  $p < 0.01$ ) had a significant negative effect. The major constraints limiting farmers' access to microfinance services were high interest rates (Mean = 2.67), inadequate collateral security (Mean = 2.60), complex loan application procedures (Mean = 2.53), delays in loan approval and disbursement (Mean = 2.49), and high loan processing costs (Mean = 2.46). The study concluded that improved access to affordable and efficient microfinance services enhances the performance of smallholder rice farmers, while high borrowing costs and institutional barriers continue to limit access to formal credit. The study therefore recommends that microfinance banks should reduce lending interest rates and provide flexible credit packages, adopt flexible collateral arrangements through group lending, simplify and expedite loan processing and disbursement, and collaborate with government and extension agencies to strengthen financial literacy while promoting microsavings and agricultural insurance among smallholder rice farmers.

**Keywords:** Microfinance services, Smallholder rice farmers, Farm performance, Agricultural credit, Taraba State.

## 1 INTRODUCTION

Agriculture remains one of the most important sectors of the Nigerian economy, providing employment, income, raw materials for industries, and food for the rapidly growing population. In many developing countries, including Nigeria, agriculture is the primary livelihood of rural households and plays a significant role in poverty reduction, food security, and economic development. The performance of the agricultural sector is therefore critical to improving rural livelihoods because a large proportion of the poor depend directly on agriculture for their means of subsistence (Zhiri, 2018).

The productivity and performance of the agricultural sector depend largely on farmers' access to productive resources, particularly financial services. Adequate financing enables farmers to purchase improved seeds, fertilizers, agrochemicals, machinery, irrigation facilities, and other modern technologies required to increase agricultural output. According to Moshood (2023), the success of the agricultural sector depends largely on farmers' access to agricultural credit and other productive inputs. However, inadequate financing continues to constrain agricultural production in many developing countries, limiting farmers' ability to adopt improved technologies and expand production.

Microfinance has emerged as one of the major approaches to improving financial inclusion among low-income households, particularly smallholder farmers who are often excluded from conventional banking services. Microfinance refers to the provision of financial services such as credit, savings, insurance, money transfer, and payment facilities to low-income individuals and small-scale entrepreneurs. These services enable poor households to invest in productive activities, smooth consumption, manage production risks, build assets, and improve their livelihoods (Pollinger et al., 2017). In agriculture, microfinance provides farmers with the financial resources required to purchase farm inputs at the appropriate time, invest in improved technologies, and cope with production uncertainties. Nevertheless, despite the increasing importance of microfinance, many farmers still experience limited access to affordable financial services due to high borrowing costs, stringent lending requirements, and inadequate outreach of formal financial institutions (Enimu et al., 2017).

Among Nigeria's major food crops, rice (*Oryza sativa*) occupies a strategic position because of its importance to food security, employment generation, and rural income. Rice has become one of the most widely consumed staple foods in Nigeria, serving as a major source of calories for millions of households while providing livelihoods for farmers, processors, marketers, and other actors along the value chain (Ademiluyi et al., 2021, as cited in Garba et al., 2025). The crop has witnessed increasing demand over the years due to rapid population growth, urbanization, changing food preferences, and rising household incomes.

Despite Nigeria being the largest producer and consumer of rice in West Africa, domestic production has consistently failed to meet national demand. According to the Food and Agriculture Organization (FAO, 2025), Nigeria produced approximately 5.2 million metric tonnes of rice in 2023, whereas national consumption was estimated at about 7.6 million metric tonnes, resulting in a supply deficit of more than 2 million metric tonnes, which is supplemented through imports and informal cross-border trade. Similarly, the National Agricultural Extension and Research Liaison Services (NAERLS, 2022) reported that rice consumption in Nigeria has continued to increase by approximately 5% annually, while production has grown at a much slower rate due to low productivity, inadequate mechanization, poor irrigation facilities, limited use of improved technologies, inadequate access to quality farm inputs, and insufficient agricultural financing. The persistent gap between domestic production and consumption has continued to increase Nigeria's dependence on imported rice despite several government interventions aimed at achieving rice self-sufficiency (FAO, 2025; NAERLS, 2022).

One of the major constraints limiting increased rice production is inadequate access to appropriate financial services. Smallholder rice farmers often require credit to purchase improved seeds, fertilizers, agrochemicals, labour, and machinery, but many are unable to obtain adequate financing from conventional financial institutions because of collateral requirements, high transaction costs, and perceived production risks. To bridge this financing gap, microfinance institutions have become increasingly important by providing relatively accessible financial services, including microcredit, microsavings, and agricultural insurance, to resource-poor farmers. Access to these services has the potential to improve farm productivity, increase farm income, enhance resilience to production risks, and improve farmers' overall welfare (Taiwo & Agwu, 2016).

Empirical studies have consistently demonstrated that access to financial services contributes positively to agricultural productivity and poverty reduction. Studies by Hounlonkou et al. (2005), Simtowe et al. (2009), and Asfaw et al. (2012) revealed that improved access to agricultural finance enhances farmers' investment in productive technologies, increases farm productivity, and reduces rural poverty. However, many smallholder farmers continue to experience inadequate access to formal financial services, while available credit is often associated with high interest rates, collateral requirements and complex lending procedures. Abebe (2005) observed that inadequate financial resources

channeled to smallholder agriculture significantly constrain farmers' productive capacity, whereas Mbah (2001) noted that poor access to agricultural finance contributes to low agricultural productivity, food insecurity, and increasing dependence on food imports in Nigeria.

Although considerable attention has been devoted to improving agricultural financing in Nigeria, empirical studies on how different components of microfinance services including microcredit, microsavings, agricultural insurance, and lending conditions affect the performance of smallholder rice farmers remains limited, particularly in Taraba State. Given the strategic importance of rice production to food security, employment generation, and rural livelihoods, there is a need to generate empirical evidence on the extent to which microfinance services influence farmers' performance and the constraints they encounter in accessing these services. It is against this background that this study examined the effect of microfinance services on the performance of smallholder rice farmers in Taraba State, Nigeria. Specifically, the study described the socio-economic characteristics of the respondents, examined the effect of microfinance services on the performance of smallholder rice farmers, and identified the constraints faced by rice farmers in accessing credit from microfinance banks in the study area.

## 2 METHODOLOGY

### 2.1 Study Area

The study was conducted in Taraba State, Nigeria. The state is located in the North-East geopolitical zone of the country and lies between latitudes 6°25'N and 9°30'N and longitudes 9°30'E and 11°45'E. Taraba State shares boundaries with Bauchi and Gombe States to the north, Adamawa State to the east, Plateau and Nasarawa States to the west, Benue State to the south-west, and the Republic of Cameroon to the south-east. Administratively, the state comprises sixteen (16) Local Government Areas (LGAs), with Jalingo serving as the state capital.

According to the 2006 National Population Census, Taraba State had a population of 2,294,800 people (National Population Commission [NPC], 2006). Using the National Bureau of Statistics (NBS) annual population growth rate of 3.2%, the projected population for 2025 is approximately 4.28 million people (NBS, 2023). The state covers a land area of about 54,428 km<sup>2</sup>, making it one of the largest states in Nigeria in terms of landmass.

Taraba State experiences a tropical climate characterised by distinct wet and dry seasons. Annual rainfall ranges from about 1,000 mm in the northern parts to over 1,500 mm in the southern areas. The rainy season generally begins in April and lasts until October, while the dry season extends from November to March and is characterised by the north-eastern Harmattan winds. Average annual temperatures range between 26°C and 32°C, creating favourable conditions for the cultivation of a wide range of crops.

The state is endowed with diverse ecological zones, fertile soils, extensive river systems, floodplains, and wetlands that support both rain-fed and irrigated agriculture. Major rivers, including the Benue, Taraba, Donga, and Katsina-Ala, provide substantial opportunities for dry-season farming and irrigation. Agriculture remains the mainstay of the state's economy, employing a large proportion of the rural population.

Taraba State is one of the leading rice-producing states in North-Eastern Nigeria due to its favourable agro-ecological conditions, abundant water resources, and expansive lowland areas suitable for rice cultivation. Rice is cultivated under both rain-fed and irrigated production systems across several Local Government Areas, including Ardo-Kola, Bali, Gassol, Karim-Lamido, Lau, Takum, Wukari, Yororo, and Zing. The state has benefited from various agricultural and rural finance interventions implemented by institutions such as the Central Bank of Nigeria (CBN), the Bank of Agriculture (BOA), the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL), microfinance banks, cooperative societies, and development partners. These institutions provide financial services, including agricultural loans, savings facilities, credit guarantees, and other support aimed at improving farmers' access to production resources, enhancing productivity, and increasing farm income.

The predominance of rice farming, coupled with the presence of formal and informal microfinance service providers, makes Taraba State an appropriate location for examining the effects of microfinance services on the performance of rice farmers.

### 2.2 Sources of Data

Data for the study were obtained from both primary and secondary sources. Primary data were collected using questionnaires administered to selected rice farmers in the study area. Secondary data were sourced from the records of selected microfinance banks operating in Taraba State, as well as relevant government publications, statistical reports, policy documents, and academic literature to complement the primary data and provide additional information on microfinance service delivery in the state.

### 2.3 Sampling Technique and Sample Size

A multi-stage sampling technique was employed to select the respondents for the study. In the first stage, five microfinance banks operating in Taraba State and providing financial services to rice farmers were purposively selected. These were Taraba Microfinance Bank Ltd., Jalingo; Jen Microfinance Bank; Ure Microfinance Bank, Takum; Avvi Microfinance Bank, Wukari; and LAPO Microfinance Bank.

In the second stage, a snowball sampling technique was used to identify rice farmers who had accessed microfinance services from the selected banks. Information obtained from the banks and farmer referrals was used to establish a sampling frame comprising 9,497 rice farmers across the five participating microfinance institutions.

In the third stage, the sample size was determined using the Yamane (1967) formula for finite populations:

$$n = \frac{N}{1 + Ne^2} \text{-----(1)}$$

where  $n$  is the sample size,  $N$  is the population size (9,497), and  $e$  is the level of precision (0.05). Substituting the values into the formula yielded a sample size of approximately 384 respondents.

In the fourth stage, Cochran's (1977) proportional allocation formula was used to distribute the questionnaires among the selected microfinance banks in proportion to the number of rice farmers served by each institution. The formula is expressed as:  $n_h = \frac{N_h}{N} \times n$  -----(2)

where:

$n_h$  = sample size for the  $h^{th}$  microfinance bank;

$N_h$  = number of rice farmers in the  $h^{th}$  microfinance bank;

$N$  = total number of rice farmers; and

$n$  = total sample size (384).

This ensured that each bank was fairly represented in the study according to its share of the study population.

**Table 1: Population and Sample Size of the Study**

| Microfinance Bank                      | Number of Farmers (N) | Sample Size (n) |
|----------------------------------------|-----------------------|-----------------|
| Taraba Microfinance Bank Ltd., Jalingo | 2,027                 | 82              |
| Jen Microfinance Bank                  | 981                   | 40              |
| Ure Microfinance Bank, Takum           | 1,123                 | 45              |
| Avvi Microfinance Bank, Wukari         | 1,854                 | 75              |
| LAPO Microfinance Bank Jalingo         | 3,512                 | 142             |
| <b>Total</b>                           | <b>9,497</b>          | <b>384</b>      |

Source: Field Survey (2026).

### 2.4 Methods of Data Analysis

Data collected for the study were analysed using both descriptive and inferential statistics. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarise the socio-economic characteristics of the respondents and constraints to their access to microfinance services. Inferential analysis was carried out using the Ordinary Least Squares (OLS) multiple regression technique to examine the effect of microfinance services on the performance of rice farmers in Taraba State. The OLS regression model was considered appropriate because it estimates the relationship between a dependent variable and multiple independent variables and determines the magnitude and direction of their effects.

### 2.5 Multiple Regression Model

The model is specified in its implicit (functional) form as:

$$FP = f(MC, MS, IS, IR, AFI + \varepsilon_i) \text{-----(3)}$$

where:

FP = Performance of the *i*th smallholder rice farmer (yield kg)

MC = Micro-credit accessed by the farmer (in Naira)

MS = Micro-savings of the farmer (in Naira)

IS = Insurance services accessed by the farmer (access=1, not access=0)

IR = Interest rate on the loan; and

AF = Annual farm income. (Naira)

$\varepsilon_i$  = Error term

The explicit (econometric) form of the model is expressed as:

where:

$$FP_i = \beta_0 + \beta_1 MC_i + \beta_2 MS_i + \beta_3 IS_i + \beta_4 IR_i + \beta_5 AFI_i + \varepsilon_i \text{-----(4)}$$

$FP_i$  = Performance (rice yield in kg) of the *i*th smallholder rice farmer

$\beta_0$  = Constant (intercept)

$\beta_1 - \beta_5$  = Parameters (regression coefficients) to be estimated

$MC_i$  = Micro-credit accessed by the *i*th farmer (₦)

$MS_i$  = Micro-savings of the *i*th farmer (₦)

$IS_i$  = Insurance services accessed by the *i*th farmer (1 = access, 0 = no access)

$IR_i$  = Interest rate on the loan obtained by the *i*th farmer (%)

$AFI_i$  = Annual farm income of the *i*th farmer (₦)

$\varepsilon_i$  = Random error term

Four functional forms were estimated, among which the Cobb–Douglas (double-log) model provided the best fit based on economic, econometric, and statistical criteria. Consequently, it was selected as the lead equation and used to explain the findings. The models were specified as follows:

#### Linear function

$$FP_i = \beta_0 + \beta_1 MC_i + \beta_2 MS_i + \beta_3 IS_i + \beta_4 IR_i + \beta_5 AFI_i + \varepsilon_i \text{-----(5)}$$

#### Semi-log function

$$FP_i = \beta_0 + \beta_1 \ln MC_i + \beta_2 \ln MS_i + \beta_3 IS_i + \beta_4 IR_i + \beta_5 \ln AFI_i + \varepsilon_i \text{-----(6)}$$

#### Exponential function

$$\ln FP_i = \beta_0 + \beta_1 MC_i + \beta_2 MS_i + \beta_3 IS_i + \beta_4 IR_i + \beta_5 AFI_i + \varepsilon_i \text{-----(7)}$$

#### Double-log function (Lead equation)

$$\ln FP_i = \beta_0 + \beta_1 \ln MC_i + \beta_2 \ln MS_i + \beta_3 IS_i + \beta_4 \ln IR_i + \beta_5 \ln AFI_i + \varepsilon_i \text{-----(8)}$$

### 3 RESULTS AND DISCUSSION

#### 3.1 Socio-economic Characteristics of the Respondents

The socio-economic characteristics of the respondents presented in Table 2 showed that 76.0% of the respondents were male, while 24.0% were female, indicating that rice farming in the study area is predominantly undertaken by men. This may be attributed to the labour-intensive nature of rice production, which requires substantial physical effort and greater access to productive resources such as land. However, the participation of women demonstrates that they also contribute to rice production despite their relatively lower representation. This finding agrees with Abdulrahman et al. (2023), who reported that rice farming in North-Central Nigeria was dominated by male farmers because of their greater access to land and productive resources, although female farmers also contributed significantly to rice production.

Regarding marital status, the majority (78.4%) of the respondents were married, while 10.4% were single, 7.0% were widowed, and 4.2% were divorced. The predominance of married farmers indicates that family labour is readily available for farming activities in the study area. Married households are more likely to utilize family members during planting, weeding, harvesting, and post-harvest operations, thereby reducing labour costs and improving production efficiency. This finding is consistent with the report of Adewuyi and Okunmadewa (2022), who found that most rice farmers were married and relied heavily on family labour, which contributed to improved production efficiency and reduced labour costs.

The educational distribution revealed that 37.0% of the respondents had secondary education, 22.6% attained tertiary education, 22.4% completed primary education, while 18.0% had no formal education. This indicates that the majority of the farmers possessed some level of formal education, which is expected to enhance their ability to understand credit requirements, manage farm records, adopt improved farming technologies, and utilize microfinance services effectively. This finding corroborates the study of Ahmed et al. (2021), who reported that educational attainment significantly improves farmers' ability to adopt improved technologies, understand financial procedures, and effectively utilize agricultural credit.

The findings further revealed that 60.2% of the respondents had access to extension services, whereas 39.8% had no access. This shows that a considerable proportion of farmers received technical guidance on improved production practices and agricultural innovations. Access to extension services may also expose farmers to information on available credit opportunities and sound financial management practices. This finding agrees with Umar et al. (2023), who reported that extension contact enhances farmers' awareness of improved production practices, financial opportunities, and the adoption of agricultural innovations, thereby improving farm productivity.

Membership of farmers' associations was relatively high, with 71.9% of the respondents belonging to at least one association, while 28.1% were non-members. Since many microfinance institutions prefer lending through organized groups because of improved loan monitoring and repayment, the high level of association membership is expected to promote farmers' access to credit and improve their farm performance. This finding supports the study of Bako et al. (2022), who found that membership of farmers' associations significantly improves farmers' access to agricultural credit, extension services, and improved production inputs through collective action and group lending arrangements.

The average age of the respondents was 44 years, with ages ranging from 22 to 72 years. This indicates that most of the farmers were within their economically active and productive years. Farmers in this age category are generally energetic and possess sufficient farming experience to effectively utilize financial resources and adopt improved production practices that enhance farm performance. This finding is in agreement with Mohammed et al. (2024), who reported that most rice farmers were within the active working-age group, making them more receptive to innovation and better able to utilize agricultural credit effectively.

The mean farm size was 2.24 hectares, with farm holdings ranging from 0.50 to 6.80 hectares. This confirms that rice production in the study area is dominated by smallholder farmers cultivating relatively small parcels of land. Small farm sizes often limit farmers' production capacity and income, making access to microfinance services essential for purchasing improved seeds, fertilizers, agrochemicals, and other productive inputs required to increase output. This finding agrees with Michael et al. (2025), who reported that smallholder farmers in Nigeria generally cultivate less than five hectares of land, making external financing necessary for expanding production and adopting improved technologies.

The average household size was 7 persons, with household sizes ranging from 2 to 18 persons. This indicates that households in the study area are relatively large and can provide family labour for various farming operations, thereby reducing dependence on hired labour. However, larger household sizes may also increase household consumption

needs, thereby creating greater demand for agricultural credit to finance production while meeting family obligations. This finding corroborates the report of Olagunju et al. (2022), who found that relatively large household sizes provide family labour for agricultural production but also increase household financial obligations, thereby increasing the demand for agricultural credit.

The respondents recorded a mean annual farm income of ₦1,087,650, with incomes ranging from ₦185,000 to ₦4,950,000. The wide variation in income reflects differences in farm size, access to productive resources, managerial ability, and the adoption of improved production practices among farmers in the study area. Farmers with relatively higher incomes may have greater repayment capacity and easier access to formal credit, whereas lower-income farmers are more likely to depend on microfinance services to finance their farming activities and improve their livelihoods. This finding is consistent with Edaba et al. (2025), who observed that farmers with higher annual farm incomes were more likely to access and utilize agricultural credit because they possessed greater repayment capacity and financial credibility.

**Table 2: Socio-economic Characteristics of the Respondents (n=384)**

| Variable                                  | Frequency   | Percentage |            |
|-------------------------------------------|-------------|------------|------------|
| <b>Sex</b>                                |             |            |            |
| Male                                      | 292         | 76.0       |            |
| Female                                    | 92          | 24.0       |            |
| <b>Marital Status</b>                     |             |            |            |
| Single                                    | 40          | 10.4       |            |
| Married                                   | 301         | 78.4       |            |
| Divorced                                  | 16          | 4.2        |            |
| Widowed                                   | 27          | 7.0        |            |
| <b>Educational Level</b>                  |             |            |            |
| No formal education                       | 69          | 18.0       |            |
| Primary education                         | 86          | 22.4       |            |
| Secondary education                       | 142         | 37.0       |            |
| Tertiary education                        | 87          | 22.6       |            |
| <b>Access to Extension Services</b>       |             |            |            |
| Access                                    | 231         | 60.2       |            |
| No access                                 | 153         | 39.8       |            |
| <b>Membership of Farmers' Association</b> |             |            |            |
| Member                                    | 276         | 71.9       |            |
| Non-member                                | 108         | 28.1       |            |
| <b>Continuous variable</b>                | <b>Mean</b> | <b>Min</b> | <b>Max</b> |
| Age (years)                               | 44          | 22         | 72         |
| Farm size (ha)                            | 2.24        | 0.50       | 6.80       |
| Household size (persons)                  | 7           | 2          | 18         |
| Annual farm income (₦)                    | 1,087,650   | 185,000    | 4,950,000  |

Source: Field survey, 2026

### 3.2 Effects of Microfinance Services on the Performance of Smallholder Rice Farmers

The multiple regression results presented in Table 3 show the effects of microfinance services on the performance of smallholder rice farmers in the study area. Four functional forms (linear, semi-log, exponential, and double-log) were estimated, and the double-log model was selected as the lead equation because it produced the highest coefficient of

determination ( $R^2 = 0.781$ ), the highest adjusted  $R^2$  (0.777), a highly significant F-statistic (265.71;  $p < 0.01$ ), the lowest mean Variance Inflation Factor (VIF = 2.19), and a statistically insignificant Ramsey RESET test (Prob > F = 0.461), indicating that the model was correctly specified.

The coefficient of determination ( $R^2 = 0.781$ ) indicates that approximately 78.1% of the variation in the performance of smallholder rice farmers in the study area was explained by the microfinance service variables included in the model, while the remaining 21.9% was explained by factors not captured in the regression model. The significant F-statistic (265.71;  $p < 0.01$ ) further indicates that the explanatory variables jointly had a statistically significant influence on farmers' performance.

The diagnostic statistics further confirmed the reliability of the estimated model. The mean VIF of 2.19 indicates the absence of serious multicollinearity among the explanatory variables, as the value is well below the commonly accepted threshold of 10. Likewise, the Ramsey RESET probability value of 0.461 suggests that the model did not suffer from functional form misspecification, indicating that the estimated coefficients are reliable for policy interpretation.

The coefficient of microcredit was positive and statistically significant at the 1% level ( $\beta = 0.214$ ). This indicates that increased access to microcredit significantly improved the performance of smallholder rice farmers in the study area. Specifically, a 1% increase in access to microcredit increased farmers' performance by approximately 0.214%, holding other factors constant. The positive relationship may be attributed to the fact that credit enables farmers to purchase improved seeds, fertilizers, agrochemicals, machinery, and other production inputs at the appropriate time. This finding is consistent with Ibrahim and Sani (2025), who reported that microcredit had a positive and significant effect on the performance of smallholder rice farmers in Kaduna State, Nigeria. Similarly, Ogbonna et al. (2025) found that access to microcredit significantly enhanced agricultural productivity and farm income among smallholder farmers in Southeast Nigeria by bridging financial constraints and facilitating investment in productivity-enhancing technologies.

The coefficient of microsavings was also positive and significant at the 5% level ( $\beta = 0.136$ ). This implies that improved savings mobilisation among farmers contributed positively to their performance in the study area. A 1% increase in microsavings was associated with a 0.136% increase in farmers' performance. Savings provide farmers with financial security and enable them to accumulate capital for future investment in agricultural production. The positive influence of savings agrees with the view of Ogbonna et al. (2025), who observed that improved financial inclusion through microfinance services strengthens farmers' capacity to invest in productive agricultural activities and enhances farm income and productivity.

The coefficient of insurance services was positive and statistically significant at the 10% level ( $\beta = 0.071$ ). This indicates that farmers who had access to agricultural insurance were more likely to record better farm performance than those without access, holding other factors constant. The positive coefficient shows that access to insurance increases the likelihood of improved performance among smallholder rice farmers in the study area. This may be because agricultural insurance provides financial protection against production risks such as drought, floods, pests, diseases, and other unforeseen events. This finding is supported by Gulseven (2020), who reported that agricultural insurance encourages farmers to undertake productive investments by reducing production risks and providing financial protection against unforeseen losses, thereby improving the likelihood of better farm outcomes.

The coefficient of interest rate was negative and significant at the 1% level ( $\beta = -0.184$ ). This indicates that higher interest rates significantly reduced the performance of smallholder rice farmers in the study area. Specifically, a 1% increase in interest rates reduced farmers' performance by approximately 0.184%, all else being equal. High borrowing costs discourage farmers from accessing formal credit or increase the financial burden of loan repayment, leaving fewer resources available for productive farm investments. This finding is in agreement with Ibrahim and Sani (2025), who recommended reducing lending interest rates because high borrowing costs constitute a major barrier to the effective utilization of microfinance services by smallholder rice farmers. It also agrees with Ameh and Lee (2022), who reported that interest rates significantly influence farmers' loan acquisition and utilization, thereby affecting agricultural production decisions.

The coefficient of annual farm income was positive and significant at the 1% level ( $\beta = 0.462$ ). The result implies that a 1% increase in annual farm income increased farmers' performance by approximately 0.462%. Higher farm income enhances farmers' ability to purchase quality inputs, adopt improved technologies, employ skilled labour where necessary, and meet loan repayment obligations. This finding corroborates the study of Ameh and Lee (2022), who found that annual farm income significantly increased farmers' access to agricultural loans and improved loan utilization because higher-income farmers possess greater repayment capacity and are able to invest more in productive farm activities. Likewise, Ogbonna et al. (2025) reported that increased farm income resulting from access to financial services enabled farmers to adopt improved technologies and achieve higher agricultural productivity.

**Table 3: Multiple Regression Results on Effects of Mirco-finances Services of Performance of Rice Farmers in the Study Area**

| Variables                | Linear             | Semi-log          | Exponential       | Double-log√       |
|--------------------------|--------------------|-------------------|-------------------|-------------------|
| Constant                 | 1185.432*** (5.48) | 812.611*** (4.37) | 6.214*** (42.83)  | 2.318*** (15.42)  |
| Microcredit (MC)         | 0.00042*** (3.81)  | 84.351** (2.45)   | 0.00018** (2.36)  | 0.214*** (4.67)   |
| Microsavings (MS)        | 0.00031** (2.29)   | 52.108** (2.13)   | 0.00014** (2.18)  | 0.136** (2.58)    |
| Insurance Services (IS)  | 112.514* (1.87)    | 95.328* (1.79)    | 0.084* (1.96)     | 0.071* (1.85)     |
| Interest Rate (IR)       | -18.462*** (-3.42) | -13.615** (-2.71) | -0.012*** (-3.16) | -0.184*** (-3.72) |
| Annual Farm Income (AFI) | 0.00063*** (5.23)  | 176.221*** (5.01) | 0.00027*** (4.98) | 0.462*** (6.31)   |
| R <sup>2</sup>           | 0.648              | 0.691             | 0.708             | 0.781             |
| Adjusted R <sup>2</sup>  | 0.643              | 0.686             | 0.704             | 0.777             |
| F-statistic              | 138.42***          | 162.57***         | 179.34***         | 265.71*           |
| Prob > F                 | 0.000              | 0.000             | 0.000             | 0.000             |
| Mean VIF                 | 2.31               | 2.28              | 2.34              | 2.19              |
| Ramsey RESET (Prob > F)  | 0.031              | 0.084             | 0.097             | 0.461             |

Source: Field survey, 2026. NB: Figures in parentheses are t-values. \*\*\*Significant at 1%; \*\*Significant at 5%; \*Significant at 10%; √=best model

### 3.3 Constraints in Accessing Credit from Microfinance Banks among Rice Farmers

The results presented in Table 4 show the major constraints faced by smallholder rice farmers in accessing credit from microfinance banks in the study area. The constraints were ranked using mean scores based on a three-point Likert scale, where a higher mean score indicates greater severity. The findings reveal that all the identified constraints recorded mean scores above the benchmark of 2.00, indicating that they were generally perceived as severe impediments to accessing microfinance credit.

The findings revealed that high interest rates on loans constituted the most serious constraint, with a mean score of 2.67, and was ranked 1<sup>st</sup>. About 73.2% of the respondents considered it very severe, while 20.3% rated it as severe. This finding indicates that the high cost of borrowing discourages many farmers from seeking credit and increases the financial burden of loan repayment. This finding agrees with Arasomwan (2019) who reported that the high cost of agricultural credit limits farmers' access to finance, forcing many smallholder farmers to depend on informal lenders that charge exorbitant interest rates, thereby constraining agricultural investment and productivity.

The second most important constraint was inadequate collateral security, which recorded a mean score of 2.60 and ranked 2<sup>nd</sup>. The result showed that 68.8% of the respondents regarded collateral requirements as very severe. This shows that many smallholder farmers lack valuable assets or formal land titles required by microfinance institutions as loan security. This result is consistent with the findings of Okoro and Nwali (2017) who revealed that lack of acceptable collateral remains one of the greatest barriers preventing rural farmers from accessing formal agricultural credit because many do not possess legally recognized land titles or other acceptable assets required by lending institutions.

Complex loan application procedures ranked 3<sup>rd</sup> with a mean score of 2.53. The majority of the respondents (64.6%) perceived the procedures involved in obtaining loans as very severe. The complexity of documentation, lengthy administrative requirements, and cumbersome application processes may discourage farmers, particularly those with limited formal education, from applying for credit. This finding corroborates the observations of Oluwamayokun (2018) who reported that low educational attainment and limited access to credit information often make it difficult for rural farmers to understand and complete formal loan application requirements.

The respondents also identified delay in loan approval and disbursement as a serious challenge, with a mean score of 2.49, ranking 4<sup>th</sup>. Timely access to credit is essential in agricultural production because farming operations such as land preparation, planting, fertilizer application, and pest control are highly time-sensitive. The observed delay may be associated with the lengthy administrative procedures commonly employed by formal financial institutions, a situation

that has been reported by Fadeyi (2018) as one of the institutional factors limiting farmers' effective access to agricultural finance.

The high cost of loan processing ranked 5<sup>th</sup> with a mean score of 2.46. Beyond interest charges, farmers incur additional expenses such as processing fees, administrative charges, and other transaction costs before obtaining loans. This finding supports the report of Lemessa and Gemechu (2016), who found that the administration of rural agricultural credit is generally expensive due to poor road networks, weak communication facilities, and high operational costs incurred by financial institutions, which are ultimately transferred to borrowers.

Inadequate loan amounts granted was ranked 6<sup>th</sup> with a mean score of 2.43. Although some farmers were able to access credit, the amount approved was often insufficient to finance the scale of production required. As a result, farmers may be unable to purchase adequate quantities of improved seeds, fertilizers, agrochemicals, and other essential production inputs, thereby limiting the potential impact of credit on farm performance. This finding is in agreement with Ikenga et al (2024), who noted that inadequate financing limits farmers' ability to expand production and adopt improved technologies, thereby reducing the economic benefits expected from agricultural credit.

The findings further revealed that lack of awareness of available credit schemes ranked 7<sup>th</sup> with a mean score of 2.30. This indicates that many farmers are not adequately informed about existing microfinance programmes, eligibility requirements, or loan application procedures. This finding supports the reports of Rahman et al. (2022) who revealed that inadequate knowledge of available funding opportunities and low literacy levels prevent many rural farmers from benefiting from government and institutional agricultural credit programmes.

Distance to microfinance bank branches ranked 8<sup>th</sup> with a mean score of 2.27. The result shows that the physical location of financial institutions remains a barrier to credit access for many farmers in the study area. This finding agrees with Umeh et al. (2023) who reported that poor access to banking services, inadequate rural infrastructure, scattered settlements, and long distances to financial institutions significantly reduce farmers' access to formal agricultural credit.

**Table 4: Constraints to Accessing Credit from Microfinance Banks among Rice Farmers in Taraba State (n = 384)**

| Constraints                                   | Very Severe (3) | Severe (2) | Not Severe (1) | Mean | Rank | Decision    |
|-----------------------------------------------|-----------------|------------|----------------|------|------|-------------|
| High interest rate on loans                   | 281 (73.2)      | 78 (20.3)  | 25 (6.5)       | 2.67 | 1    | Very Severe |
| Inadequate collateral security                | 264 (68.8)      | 86 (22.4)  | 34 (8.8)       | 2.60 | 2    | Very Severe |
| Complex loan application procedures           | 248 (64.6)      | 91 (23.7)  | 45 (11.7)      | 2.53 | 3    | Very Severe |
| Delay in loan approval and disbursement       | 233 (60.7)      | 105 (27.3) | 46 (12.0)      | 2.49 | 4    | Severe      |
| High cost of loan processing                  | 226 (58.9)      | 110 (28.6) | 48 (12.5)      | 2.46 | 5    | Severe      |
| Inadequate loan amount granted                | 218 (56.8)      | 114 (29.7) | 52 (13.5)      | 2.43 | 6    | Severe      |
| Lack of awareness of available credit schemes | 186 (48.4)      | 126 (32.8) | 72 (18.8)      | 2.30 | 7    | Severe      |
| Distance to microfinance bank branches        | 179 (46.6)      | 131 (34.1) | 74 (19.3)      | 2.27 | 8    | Severe      |
| Short repayment period                        | 171 (44.5)      | 138 (35.9) | 75 (19.6)      | 2.25 | 9    | Severe      |
| Poor financial records/business plan          | 146 (38.0)      | 154 (40.1) | 84 (21.9)      | 2.16 | 10   | Severe      |

Source: Filed survey, 2026. Decision Rule: Mean  $\geq 2.50$  = Very Severe; 1.50–2.49 = Severe; Mean  $< 1.50$  = Not Severe.

Short repayment periods ranked 9<sup>th</sup> with a mean score of 2.25. Agricultural production is seasonal, and farm income is generally realized after harvesting. Consequently, short repayment schedules may not correspond with farmers' cash flow, making it difficult to repay loans without financial stress. This finding is also consistent with Arasomwan (2019),

who observed that agricultural production is characterized by seasonal income, making short-term loan repayment conditions unsuitable for many smallholder farmers.

Finally, poor financial records and inadequate business plans ranked 10<sup>th</sup> with a mean score of 2.16. Although this was the least severe constraint among those identified, it remained an important challenge. Many smallholder farmers lack adequate record-keeping skills and formal business plans required by financial institutions during loan appraisal. This finding corroborates the reports of Michael et al. (2025) who found that low educational attainment and limited managerial skills among rural farmers reduce their ability to prepare the financial records and documentation required by formal lending institutions.

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## 4 CONCLUSION

The study concluded that microfinance services play a major role in improving the performance of smallholder rice farmers in Taraba State. The findings showed that access to financial services such as credit, savings, and agricultural insurance enables farmers to invest more in rice production, adopt improved farming practices, and increase their productivity and income. However, the benefits of these services are limited by challenges such as high interest rates, stringent collateral requirements, complicated loan application procedures, delays in loan disbursement, and high loan processing costs.

### *Recommendations*

Based on the findings of the study, the following recommendations are made:

- i. Microfinance banks should reduce lending interest rates and provide affordable, farmer-friendly credit packages with flexible repayment terms to improve smallholder rice farmers' access to credit.
- ii. Microfinance institutions should adopt flexible collateral requirements through group lending and cooperative guarantee schemes to enable more farmers to access formal credit.
- iii. Loan application, approval, and disbursement processes should be simplified and expedited to ensure that farmers receive credit promptly, especially before the farming season.
- iv. Government, extension agencies, and microfinance institutions should strengthen financial literacy programmes and promote microsavings and agricultural insurance to improve farmers' financial management, access to credit, and resilience to production risks.

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## STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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The authors declare that there is no conflict of interest regarding the publication of this study.

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