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Rural Micro-financing and Food Insecurity in Nigeria

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ABSTRACT

Background: Significantly, micro and small-scale farmers have contributed to the manufacturing output, employment and exports of Nigeria but in the area of food security they are lacking. The growing hunger in the land, worsened by the vanishing purchasing power of most Nigerians especially in the rural areas is a threat no serious government can afford to treat with indifference. However, access to timely and reliable financing at competitive rates, remains a key bottleneck in the growth of this sector for effective food security. From the foregoing, this study examined the impact of rural micro financing on food insecurity in Nigeria.
Materia3s and Methods: The study was carried out in Oyo state through survey design on a sample of 164 respondents drawn from six (6) villages and the data collected though the questionnaire and interview were used for descriptive analysis with logit and tobit regression methods of analysis.
Results: The results of the survey showed that lack of credit facilities to farmers affected their production capacities as well as production efficiency. The results also showed that farmer's household size, collateral, land ownership, significantly determined the farmer's accessibility to credit in the study area.
Conclusion: The study concluded that adequate credit facilities to this labour-intensive sector will ultimately increase agricultural productivity and facilitate value chain integration which will enhance employment opportunities for unskilled labour and contribute to food security and stability in Nigeria.
Recommendation: The study recommends among others the need for the Central Bank of Nigeria to introduce innovative financing mechanisms for farmers in the rural areas in order to boast food production capacity so as to avert food insecurity in Nigeria.

Key words: Agricultural-productivity, Food-insecurity, Innovative-financing, Micro-Financing, Micro and small-scale farmers

INTRODUCTION

Neglect of the agricultural sector since the discovery of oil in the 1970s has made Nigeria one time the food basket of West Africa and now a net food-importer. Despite recent, strong growth in the agricultural sector, the country spends $11 billion annually to import wheat, rice, sugar and fish. Underinvestment in agriculture has resulted to high level of market demand for food by the starving and destitute people which also has an inverse relationship to their nutritional needs. Specifically, over 70 % of Nigerians live on less than 1 US Dollar per day, their lives plagued by acute hunger and malnutrition or threats of their occurrence (Dada 2011). Food insecurity among rural households is 71% (Orewa and Iyangbe 2010), and such households have limited economic and physical capacity to sustain their present level of wellbeing or cope with economic shocks (IFPRI 2008 and Corporate Nigeria, 2011).

Typically, the problem of decline in the agriculture sector is repeated across the country where almost every productive sector has seen disinvestment and a loss of quality jobs. This absence of employment opportunities led to inadequate purchasing power to acquire food even if the market succeeds in stimulating production. The only solution for food deficit families is to produce their own food but they are the first to be ignored by the financial market since they possess few resources, have no collateral, and involve high risks and transaction costs. This category of families is plenty in Nigeria and need financial assistance, which cannot be determined by the market to secure self-sufficiency in food production. Therefore, stimulating food production is desirable in Nigeria by the poor and marginalized rural inhabitants beyond a market stimulated production level.

Notwithstanding these problems, successful governments in Nigeria have embarked on various strategies in dealing with the food insecurity and under-nutrition in the country. One of these programmes is the Rural Finance Institution Building Programme (RUFIN) set up in 2010 to enhance the access of the rural populace to the services of Non-Bank Micro Finance Institutions but none yielded any meaningful results in Nigeria. The key element in food security policy is poverty reduction, because poor people spend such a large share of their incomes on food, especially the poor people that obtain much of their income from farming, leaving them vulnerable to high food prices which eventually lead to decline in agricultural output.

The high rate of food insecurity in Nigeria for the past four decades is as a result of neglect in food production when oil has become the major export product. Also, the adoption of neo-liberal economic policies, ethnic and religious conflicts; disasters, such as flooding and drought have contributed to food insecurity in Nigeria.

More so, important gender issues exist in the agriculture sector in Nigeria. Women are in significant percentage of small farmers which particularly depend almost exclusively on the informal financial market that manage many farms individually or collectively. Buvinic and Berger (1990) also observed that women are frequently discriminated against in formal credit markets in developing countries with emphasizes that women lack major control over economic/financial resources.

Traditionally, there have been a large number of micro and small farmers at various rural areas across the country. Most of them do provide farm produce for consumption and have necessary experience in their line of activity but they do not have necessary financial resources to farm on large scale and market their farm produce. At the same time banks are not inclined to grant credit facilities to them because they are in the informal sector and are not in a position to provide the necessary collateral security to the banks. Instead, they are only opportune to borrow from informal money lenders to meet their farming exigencies at an exorbitant interest rate varying from 36% to 200% depending upon the urgency of their requirement.

Accessibility to credit by rural farmers cannot be compromised because they need credit for a range of productive and protective purposes. The escalating food deficits in Nigeria are other aspects that come to the fore in connection to improvement

of rural financial services. Improvements in rural financial markets can be a key stimulus for accelerating agricultural productivity and food security. Therefore, there is an urgent need to provide alternative sources of finance at a reasonable interest rate to this tail of the value chain in order to enable them to upscale their operations.

The tendency for rural farmers to have access to micro finance is rare and only few empirical studies have been carried out to link this behaviour in a systematic way to food insecurity. Therefore, this study contributed to knowledge by empirically examined the impact of rural micro financing on food insecurity in Oyo State. The rest of the study is structured as follows. Section two deals with materials, section three describes the methods of data collection and statistical techniques used, while section four contain the analysis and section five is conclusion and recommendations.

Literature Review

Basically, risk and information asymmetry are the two major characteristics of credit markets which are the foundations on which Hoff and Stiglitz (1996) postulate three theories of the rural credit markets in developing countries. Their first theory emphasized on monopolistic nature of the informal markets in which the rural money lenders operate by charging exorbitant high interest rate in order to maximize profits. This theory lacks certain principles because it fails to address the coexistence of the formal and informal credit market despite the fact that the interest rates charged by the informal market's operators are higher than the formal market.

The second hypothesis hinges on the notion that rural credit market is perfectly competitive at the market clearing equilibrium where high interest rates indicate high risk of borrowers. Stiglitz and Weiss (1981) further observed that there is no empirical evidence to confirm this theory because credit rationing in the rural credit market does not guarantee the granting of loans to applicants that even paid a higher interest rate. The third theory assumptions are that rural credit market is full of uncertainty, high transaction costs, and asymmetric information which may lead to moral hazard and adverse selection.

In line with the above, in most cases a farmer may promise to work diligently to repay a loan but when that farmer's harvest fails and defaults it will be difficult for a lender to establish whether this was as a result of bad luck or inability of the farmer to utilize the loan judiciously. So, the lender may not be able to verify this occurrence. This problem normally creates hard time for the borrower to obtain credit from any source in the first place unless they find a way of credibly signalling their commitment. For example, a lender ought to be more willing to rollover a debt following a bad harvest outcome on a farmer's project if other farmers in the area also had low harvests, but less willing if other farmers had good harvests. The purpose is to better filter signals so as to attempt to reward or punish borrowers only for those outcomes over which they exert some control and insure them against those over which they do not.

Lenders do employ indirect or direct screening techniques to reveal risk level of borrowers so as to take care of asymmetric information. As for the indirect screening the interest rate serves as both price and credit rationing a combination of price and quantity of credit that is below the market clearing level. This is the same as Stiglitz and Weiss (1981) price-quality theorem, which postulates that when the expected quality of a commodity is a function of its price, as in the case of credit, equilibrium may be represented by quantity rationing.

Credit suppliers can also use direct screening techniques such as geography, kinship, and inter-linkages with other markets to solve the problems of asymmetric information, incentives and enforcement. Serious information asymmetries and enforcement problems may lead to market failures that are difficult to repair which may deter the entry of new financial intermediaries in helping rural communities to realize the gains to finance trade. This may make the market to be monopolistically

competitive. Since the empirical evidence on these theories is scanty this study provided further empirically evidence by exploited this model.

For the purpose of this study rural micro financing refers to agricultural finance that support all agriculture related activities located in rural area especially which facilitate food security. The financial institutions that provide this type of credit are product traders, banks, cooperatives and mutual, contract farming firms (Carter, Barham, and Mesbah 1996), input suppliers, and informally relatives, friends, landlords, shopkeepers or money lenders. A defining characteristic of many of these financial transactions is that they involve active monitoring. The reason for this is to make sure that the farmers use the credit for the purpose obtained for and see that the financed projects do not fail. Monitoring is used as a substitute for both collateral guarantees and legal enforcement strategies.

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. World Food Summit (1996) observed that availability of sufficient food is a necessary condition for food security contrarily Amartya Sen, states that availability of enough food in the aggregate is not sufficient for food security. One of the most fundamental reasons why people may not have access to food is lack of market economy to generate a distribution of income that provides enough income for all to purchase the food they need.

However, lack of credit in Nigeria especially the rural areas has been identified as one of the major constraints limiting agricultural growth which often results to food insecurity. Majority of micro and small-scale farmers, whose contribution to agriculture production is crucial, are not benefiting from existing credit sources. The major constraint to this is the reluctance of banks to lend to the agricultural sector and more often than not, the loans that are offered by the banks to the rural sectors do not go to the typical small farmers. Specifically, the reasons offered by the banks for not lending to agriculture are the high default risk, uncertainty and risk inherent in agricultural production and marketing (Adebanjo, 2010).

Furtherance to this, Singh, Squire, and Strauss (1986) & de Janvry, Fafchamps, and Sadoulet (1991) explained that the organization of production on the household farm depends upon the nature of the financial markets available to the household most especially imperfect financial markets also shape production organization. Also, household labour supply response to price changes, which depends upon the household's access to financial markets. All these factored into making the poorest farmers typically produce less food than they consume, and depend on the market for the rest. With 75 percent of Nigerian populace live in rural areas, and the majority of whom depend substantially on agriculture for their livelihoods, appropriate rural financing scheme can do a great deal to improve food security.

Empirically, several studies covering important aspects of the vast literature on agricultural credit have shown the extent of credit rationing in imperfect rural financial markets but none on rural micro financing and food insecurity in Nigeria. For instance, several studies' surveys have shown that farmers would have borrowed more if additional credits were available at a given interest rate (Bell, Srinivasan, and Udry, 1997; Kochar, 1997; Zeller, Diagne, and Mataya 1998; Diagne and Zeller 2001). Eswaran and Kotwal (1986) & Sulemana and Adjei (2015) in their studies show how access to capital shapes equilibrium patterns and efficiency of production organization. Alam (1988) findings showed that the small and marginal farmers' participation in the Grameen Bank programs them and enable them to improve their agricultural productivity in high-yielding varieties. Also, Zeller (1994) & Kashuliza and Kydd (1996) results showed that the characteristics of the small holder farmers (borrowers) in Tanzania and the type and policy of financial institutions (Schmidt and Kropp (1987) greatly influence the credit accessibility. In addition, the results of Fliesig (1995), Atieno (2001) and Bigsten et al. (2003) studies showed that in developing countries asymmetric information, high risks, lack of collateral, lender borrower distance, small

and frequent credit transactions of rural households make real costs of borrowing vary among different sources of credit. More so, Hossain (1988), Padmanabhan (1996) and Hussein (2007) studies showed that flexible repayment period was favoured by most farmers and registered farmers groups were able to access agricultural credit without giving out title deeds as a collateral security. Using a probit method of analysis Mohieldin and Write (2000) results indicated that educational level, ownership of land, total assets, and sizes of the household were significant to credit accessibility. Sharma and Zeller (1996) found that social capital accounted for high repayment rates compared to traditional physical collateral-based financing. Furthermore, Okurut, Schoombee, and Berg (2005) employed a logit model analysis and the results showed that the household characteristics that influenced demand for credit included age, education, and household expenditure per adult equivalent. More so, using probit method of analysis, the results of Ibrahim and Bauer (2013) study showed that savings, value of assets and incomes are significant variables determining the credit constrained conditions.

While considerable overlap with these earlier studies is inevitable in this study, we attempted to place more emphasis than earlier studies on studying the impact of rural micro financing on food insecurity in Nigeria. This joint causation opens up the possibility of a wide range of potential equilibria, and an important research agenda.

MATERIALS AND METHODS

The Study Area

The study was conducted in Oyo state which is an inland state in South-Western Nigeria, with its capital at Ibadan. Oyo State consists of 33 Local Governments Areas (LGAs) and 29 Local Council Development Areas (LCDAs). Oyo State covers approximately an area of 28,454 square kilometres and is ranked 14th by size in Nigeria. The climate is equatorial, notably with dry and wet seasons with relatively high humidity. Average daily temperature ranges between 25 °C (77.0 °F) and 35 °C (95.0 °F), almost throughout the year. Agriculture is the main occupation of the people of Oyo State. The climate in the state favours the cultivation of crops like maize, yam, cassava, millet, rice, plantains, cocoa, palm produce, cashew etc.

The reason for choosing Oyo state is that it has vast agricultural potentials and one of the major producers and consumer of agricultural products in South West zone.

Research Design

The study carried out primary survey of micro and small-scale farmers in Oyo State using multi stage stratified sampling technique to determine the sampling size. In the first stage two local governments situated in the rural areas were selected from each of three senatorial district areas in Oyo state. From the rankings, the two least populated LGAs were selected from each senatorial district in the study area on the premise that the less populated a rural LGA, the more relatively rural such LGA, going by the definition of rural areas in Nigeria by UNESCO and NPC (2003). The second stage allowed for the selection of one village from each selected local government area. The selection of 6 villages was based on UNESCO and NPC (2003) and Fasoranti (2010) study which states that any community with a population of less than 15,000 is regarded as a village. A purposive sampling design technique was utilized to select twenty respondents who are farmers from each village giving a total of 164 respondents in the six villages under the study. The statistical formula used to determine the sample size is given as:

$$n = \frac{z^2 p.q}{d^2} \quad 1$$

Where:
n = the desired sample size.
z = the standard normal deviation at 0.05 significance level.
p = the proportion in the target population estimated to have characteristics being measured.
q = 1 – *p*
q = proportion of the sampled population in the study area.
d = level of significance

The *z*-statistic at 1 level of significance is 1.282. Since there is no estimate available for the proportion in the target population that is assumed to have the characteristics of interest (*p)*, 50 percent was used as recommended by Fisher *et al* (1983). Therefore, (*p)* would be 0.5. The level of significance is 0.05. Thus, *n* is calculated as follows:

$$n = \frac{(1.282^2) * 0.5 * 0.5}{0.05^2} \quad 2$$

Data collection

The study using structured questionnaire and interview collected only primary data on micro and small-scale farmers in Oyo state. Data were collected on the farm size (output), farmer's age, gender, marital status, education level, collateral, accessibility to credit, interest rate charged, lending institution, repayment period, land ownership, and family size. The farm size which is used as proxy for level of food insecurity determines the scale of operation of the borrowers. Farm size is classified into the different groups (large, medium and small sized farms). Large farm sizes were expected to lead in accessing agricultural credit as compared to small farms. Larger farm size affects the amount of the loan needed through a greater need for variable cash inputs, hence increasing the need for credit (Sial & Carter, 1996).

The questionnaire guide was subjected to validity test to ensure that it measures what it sets out to measure. Similarly, the questionnaire guide was pre-tested in a village (Ijesa-Ijebu in Ogun State) which is a nearby town to our University, Olabisi Onabanjo University main campus to examine how the people would react to the questions as well as their understanding of its contents. These necessitated some modifications to the questions to avoid negative reactions from respondents.

METHOD OF DATA ANALYSIS

The questionnaires were edited, coded and quantitatively analysed using descriptive statistics such as percentages, tabulation and frequency distribution. As for the regression analytical method, the study used both the Logit and Tobit regression methods of analysis to measure a number of socio-economic and credit variables. The advantage of the two models is that the probabilities are bounded between 0 and 1 and they can provide results which can be interpreted for information on the intensity of food insecurity and rural micro financing. Tobit was also used for robustness of the results.

The empirical model was developed to identify how the attributes of small, medium and large farm sizes are affected by rural microfinance variables in the promotion of food security based on logit model. In this case, the choice of these farm sizes to measure food insecurity is then modelled as a function of socio-economic and

credit variables. Thus, the ordered logit model (OLM) following Perez-Truglia (2009), was used for the estimation:

$$Y_i^* = \sum_{i=l}^{k} \beta_k X_{ki} + = Z_i + \varepsilon_i \quad \text{(i)}$$

where X is a vector of 'x s capturing farmer's age, gender, marital status, education level, collateral, interest rate charged, lending institution, repayment period, land ownership, and family size. The estimated value of Z and the disturbance term from the assumed logistic distribution can be used to predict the probability of the unobserved variables. Since Yi* falls within various thresholds limits, the general form of the probability is specified below:

$$P(Yi > j) = \frac{exp(Xi\beta - kj)}{1+[\exp(Xi\beta - kj)]}, j = 1,2, \ldots\ldots, M-1 \quad \text{(ii)}$$

Where P(Yi>j) predicts the probability for policy scenario that scales up the access to the finance, compared to the baseline probability obtained from estimated equation (i). This can be presented as a general equation:

$$Y_{it} = f(X_i) \quad (1)$$

Where Y_{it} takes on values 1, 2, ……. *k*, if individual *i* chooses alternative *j* at time *t*. The categorization is done because of the inherent ease of farm size.

Placing the objective of this study in proper perspective, and empirically measure the impact of rural micro financing on food insecurity in Nigeria, the author improves on the models of Okurut, et al (2005), Efobia, Beecrofta and Osabuohien (2014) and Adegboyega (2017).

Also, based on author's conceptual framework calibration and the theoretical arguments, the author specifies the equation based on adopting and modifying works of Okurut, et al (2005), Efobia et al., (2014) and Adegboyega (2017) by including farmer's age, gender, marital status, education level, collateral, interest rate charged, lending institution, repayment period, land ownership, and family size etc. as the case may be.

Arising from the analysis of the logit regression specification in equation (1) above, the Logit model for this study is however operationalized empirically stated as follows:

$$Y_1 = \alpha_1 + \beta_{11}X_1 + \beta_{21}X_2 + \ldots\ldots\ldots\ldots\ldots\ldots + \beta_n X_n + \varepsilon_i \quad (2)$$
$$Y_2 = \alpha_2 + \beta_{12}X_1 + \beta_{22}X_2 + \ldots\ldots\ldots\ldots\ldots\ldots + \beta_n X_n + \varepsilon_i \quad (3)$$
$$Y_3 = \alpha_3 + \beta_{13}X_1 + \beta_{23}X_2 + \ldots\ldots\ldots\ldots\ldots\ldots + \beta_n X_n + \varepsilon_i \quad (4)$$

The study model is specified as follows:

$$Y_i = f\ (AGE,\ GEND,\ MS,\ EDU,\ COLL,\ SAV,\ INT\_RATE,\ LEN\_INST,\ R\_PERIOD\ L\_OWNER, FAM\_SIZE) \quad (5)$$

Thus, food insecurity is a binary and dependent variable Y_i which is the perception of attributes (farm size) to obtain financial services, ('1' if a farmer uses any of the farm size and '0' if not); the unit of the study is the individual. Thus Y_1, Y_2, *and* Y_3 are probability of farmers using the farm size to access micro-finance: (i) small (less than 1.6 acres); (ii) medium (less than 10 acres); and (iii) large (over 10 acres).

$X_j \ldots\ldots\ldots\ldots X_n$ represent vector of the explanatory variables
$B_i \ldots\ldots\ldots\ldots\ldots \beta_n$ represent the parameter or coefficients

ε represents the independent distributed error term and α_1, α_2, and α_3 show the intercept or constraint term.
In line with the study three micro level models are stated as follows:

Model 1

$$SMALL\_SIZE = \alpha_1 + \beta_1 AGE +, \beta_{2GEND} + \beta_3 MS + \beta_4 EDU + \beta_5 COLL + \beta_6 L\_OWNERSHIP + \beta_7 SAV + \beta_8 INT\_RATE + \beta_9 LED\_INST + \beta_{10} R\_PERIOD + \beta_{11} FAM\_SIZE + \varepsilon_i \quad (6)$$

Model 2

$$MEDIUM\_SIZE = \alpha_1 + \beta_1 AGE +, \beta_{2GEND} + \beta_3 MS + \beta_4 EDU + \beta_5 L\_OWNERSHIP + \beta_6 COLL + \beta_7 SAV + \beta_8 INT\_RATE + \beta_9 LED\_INST + \beta_{10} R\_PERIOD + \beta_{11} FAM\_SIZE + \varepsilon_i \quad (7)$$

Model 3

$$LARGE\_SIZE = \alpha_1 + \beta_1 AGE +, \beta_{2GEND} + \beta_3 MS + \beta_4 EDU + \beta_5 L\_OWNERSHIP + \beta_6 COLL + \beta_7 SAV + \beta_8 INT\_RATE + \beta_9 LED\_INST + \beta_{10} R\_PERIOD + \beta_{11} FAM\_SIZE + \varepsilon_i \quad (8)$$

Food insecurity is measured by using food production index which is based on the size of the farms that a farmer cultivates. The assumption is that the size of the farm depends on the amount to be granted by the micro finance institutions which will eventually translate into high yield and production productivity. Therefore, the endogenous variables include:

SMALL_SIZE = Farm size less than 1.6 acres
MEDIUM_SIZE = Farm size less than 10 acres
LARGE_SIZE = Farm size more than 10 acres

The exogenous variables considered are those that in accordance with the literature and availability of research survey data that may influence food insecurity.
The Exogenous (Explanatory) Variables include:

Household Characteristics:

AGE = Age of the farmer (years)
GEND = Gender of the farmer (male = 1, female = 0)
MS = Marital status of the farmer
EDU = Education of the farmer (years)
L_OWNERSHIP = Land ownership
FAM_SIZE = Family size

Micro financing variables

COLL = Collateral (security) offered by the farmer
SAV = Savings of the farmers
INT_RATE = Interest rate on loan
LEND_INST = Lending financial institutions
R_PERIOD = Repayment period

DATA ANALYSIS

Table 1: Summary of Survey data

Variables	Measures	Responses	Percent Observations
Small size (Less than 1.6 acres)	No surplus	0	55.8 92
	Surplus	1	10.2 17
Medium size (Less than 10 acres)	No surplus	0	4.5 7
	Surplus	1	20.5 34
Large size (More than 10 acres)	No surplus	0	0.6 1
	Surplus	1	8.4 13
Age of the Farmers	18-25 years	1	9.1 15
	26-35 years	2	7.8 13
	36-45 years	3	8.9 14
	46-55 years	4	27.7 46
	56-65 years	5	29.4 48
	66 and above	6	17.1 28
Gender of the Farmers	Male	1	40.1 66
	Female	2	59.9 98
Educational qualification	Primary	1	35.5 58
	Secondary	2	40.3 66
	Graduate	3	20.0 33
	No education	4	4.2 7
Land ownership	Yes	1	35 57
	No	2	65 107

Family size	1 - 3	1	22
36			
	4 - 5	2	35
57			
	6 – 10	3	40
66			
	10 – and above	4	3
5			
Collateral	Yes	1	78.1
128			
	No	2	21.9
36			
Savings account	Yes	1	13.0
21			
.	No	2	87.0
143			
Interest rate charge	Low	1	22.7
37			
	High	2	77.1
127			
Lending institutions	Former	1	10.0
16			
	Others:	2	90.0
148			
	Cooperative societies Money lenders		
Repayment Period	Three months	1	4.0
7			
	Four months	2	20.1
33			
	Five months	3	25,1
41			
	Six months	4	50.8
83			

Source: Author's Compilation (2020)

Descriptive Analysis

Most of the farmers interviewed are either marginal farmers or land less farmers producing crop by taking land lease from the affluent people or communities. This makes it is extremely difficult for them to get access to credit from formal financial institutions as the credits are not collateral free. Also, majority of farmers have large family size and relying on their farm produce, leaving them vulnerable to declines in agricultural output. In addition, many farmers deal with seasonality in production because the harvest time normally record high level of production in food crops which made them to generate sufficient surplus but in post-harvest periods, they have almost nothing. The major reason for this is lack of funds to preserve their food crops in post-harvest periods which invariable lead to food insecurity. It is recorded that most of the credits available from informal sources (90%) attracted high interest rate and are against advanced sale of crops at prices much below the level prevailing in the market

during the harvesting period. Furthermore, the results showed that credit accessibility by female farmers which are very limited and attracted high interest rate make them perpetually indebted. Generally, the few financial institutions interviewed in the study area complained that the credit market is imperfect (Abreu, Pearce, and Stacchetti (1990) & Paulson and Townsend (2003). In alternative, land or chattel property, mortgage pledges or other guarantees are tied to the former loans. In terms of deposits, only 1% of the farmers maintain bank accounts.

An analysis of the repayment performance of the micro farmers revealed that the cumulative repayment has been so poor because some of the loans appeared to have irregular repayment patterns. The reasons accounted for this were mismatch in the loan repayment schedule and low level of farming activities during lean months from November to March.

Results of Multinomial Logit Regression

The results of the logit model show that there are distinct variables that influence each of the three barriers to rural micro financing analysed. The study used 5% level of significant correlations to determine those factors that could affect the probability of rural micro financing of farmers.

Small farm size

The results in table 2 below show that age, lending financial institutions and savings have significant but negative effect on small farm size but education was significantly positive. The negative coefficients of these variables could be reflecting the preference for the informal market. This is corroborated by Mohieldin and Write (2000) and Ibrahim and Bauer (2013) studies. This is consistent with the survey that 90% of the farmers resulted to informal sources of loans (cooperative societies, money lenders etc.). Additionally, education seems to be a key factor influencing accessibility to little financing from formal financial institutions. More so, the negative but significant family size coefficient shows that this category of farmers doesn't generate any surplus in the post-harvest periods because of large family size.

Table 2: Small Farm Size

Dependent variable:		**Self-exclusion**	
Independent Variables	Coefficient (βi)	Standard Error	p-values
AGE	-0.211*	0.054	0.000
EDU	0.202*	0.052	0.000
FAM_SIZE	-0.854**	0.239	0.045
LEN_INST	-0.117**	0.061	0.043
SAVINGS	-0.926*	0.259	0.000

Note. *, ** denote significance at 1 % and 5% respectively
Source: Author's Compilation, 2020

Medium farm size

The results in table 3 below show that the coefficient of gender affected medium farm size positively and significantly while the savings is negative and significant. These are within expectations, because majority of the farmers in the study area are women which particularly depend almost exclusively on the informal financial market, and manage their farms collectively. The survey corroborated this that 59.9 per cent of women are farmers and some of them own the farm land which serves as collateral. This is confirmed by collateral coefficient being positive and highly significant. Although most

of the farmers in this category generates sufficient surplus but in post-harvest periods, they have few food crops due to lack of funds to preserve their food crops in post-harvest periods which invariable lead to food insecurity.

Table 3: Medium Farm Size

Dependent variable:	Income variation		
Independent variables	Coefficient (βi)	Standard Error	p-values
GENDER	0.117**	0.046	0.012
EDU	-0.221**	0.106	0.037
COLLATERAL	0.234*	0.032	0.001
SAVINGS	-0.719**	0.284	0.011

Note. *, ** denote significance at 1 % and 5% respectively
Source: Author's Compilation, 2020

Large farm size

The gender and education coefficients which are positive and negative respectively are significant but coherent with the existing literature provide indications that people of middle age and women allocated a higher percentage of their land for the cultivation of high-yielding varieties which also improved their agricultural productivity. This was possible through farmers groups. This is evident in the results with repayment coefficient being positive and statistically significant. This is corroborated by Padmanabhan (1996) and Hossain (1988) studies. The land ownership coefficient which is positive and significant shows that this category of farmers even though they are few in the study area but able to access loans from micro finance banks. This is the only category that generates food surplus in the study area.

Table 4: Large Farm Size

Dependent variable:	Personal Reasons		
Independent variables	Coefficient (βi)	Standard Error	p-value
AGE	0.139*	0.054	0.009
GENDER	0.597**	0.243	0.014
L_OWNER	0.074**	0.036	0.043
R_PERIOD	0.329**	0.0189	0.034

Note. *, **denote significance at 1 % and 5% respectively
Source: Author's Compilation, 2020

Robustness of the Results
Tobit regression estimation technique was applied to determine the robustness of the results. This was carried out in order to make sure that the results from tables 2, 3, and 4 above are not influenced by the truncation of the explained variables. It is implied that there is high possibility that the main explained variables are neglecting some proportion of the population. This technique has been adjudged as best for dealing with cases of truncated explanatory variables (Gujarati and Porter, 2009). The coefficients of the explanatory variables under the three explained variables for logit technique corroborated with that of Tobit with regards to their signs and significant levels. The only additional variable from Tobit regression (table 5 below) which is under small farm size is interest rate charged by the informer money lenders, which is positive but insignificant. For policy action, this variable does not pose serious concerns, because government has no control over this variable but an enable environment can be provided that will promote rural micro credits. This is an area of interest for the present government in Nigeria especially in the area of agricultural policy recently formulated.

Table 5: Small Farm Size

Dependent variable:	Personal Reasons		
Independent variables	Coefficient (βi)	Standard Error	p-value
INT_RATE	0.147***	0.088	0.092

Note. *, ** denote significance at 1 % and 5% and respectively
Source: Author's Compilation, 2020

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study examined the impact of micro financing on food insecurity in Nigeria. In conclusion, the study identifies gender, educational level, land ownership, interest rate, lack of collateral, and family size as the main factors that have hindered the effectiveness of the rural credit market that can provide credit facilities to this labour-intensive sector which will ultimately increase agricultural productivity and facilitating value chain integration which will enhance employment opportunities for unskilled labour and contribute to food security and stability in Nigeria.

Recommendations

Based on the findings from this study the following recommendations are made:

- There is need for rural financial institutions to develop innovative financing mechanisms which can expand farmers' farm size and induce them to enhance agricultural output performance.
- There is need to improve rural infrastructure such as road and inland networks to facilitate easy transportation system with urban market.
- Finally, establishment of secure and convenient saving programs that can afford farmers to cope less from income stemming crop failure or natural disaster are paramount.

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