

# Smallholders' Access to Agricultural Credit in North-Central Nigeria

Ogebe, F.O\* and Ogah, M. O

*Department of Agricultural Economics, Federal University of Agriculture, Makurdi, Benue State, Nigeria*

*\*Corresponding Author*

**Abstract:**-The Government of Nigeria has implemented a policy of food security for smallholder by making provision of credit needed for purchasing inputs such as farm machinery, fertilizer and seeds. This study analyzed access to and adequacy of credit for smallholders with landholdings up to 3 hectares, using primary data collected through a survey of 556 smallholders. The study showed smallholders are constrained with regards to obtaining credit for the purchase of farm inputs for investment in farm development and this is evidenced by the significant gap between credit demand and credit supply. The results of the multiple linear regression analysis showed that the coefficients of annual income, farm size and previous loan status showed positive signs and were significant, implying that all the variables encouraged larger credit size to farmers. The study recommends flow of capital to formal institutions for onward disbursement to smallholders so as to increase their farm sizes and income thereby attracting larger credit size. It is hoped that the finding of this study will make a useful contribution to the understanding and remedying of the difficulties that smallholders experience in obtaining credit which may be of value not only in Nigeria but in other developing countries.

**Keywords:**- Agricultural credit, Smallholders, Access, Collateral, Nigeria

## I. INTRODUCTION

Smallholders account for the majority of the agricultural population in developing countries but they are vulnerable to food shortages and poverty due primarily to low agricultural production. This is a consequence of the small size of their landholdings which, in many instances, are of poor quality and the lack of capital required for investment and purchase of essential inputs. A study conducted in India revealed 87% of marginal farmers had no access to formal credit (WB 2008). Broader access to financial services such as savings and credit products, financial transactions and transfer services for remittances would expand opportunities of smallholders for adoption of more efficient technology and better resource allocation, both required for poverty alleviation and food security (WB2008). Cognizant of this, government in developing countries have provided subsidized credit for smallholders with the aim of enabling them to make the necessary investments in farm management, inputs and equipment (Ellis, 1992). As smallholders account for the major proportion of rural poor people, so their access to adequate credit has the potential to play an important role in reducing rural poverty and enhancing food security (Imai *et al.*, 2010). Effective formal credit accelerates adoption of

new technology, enhance marketing efficiency and diminishes the role of informal moneylenders (Ellis, 1992). The opportunity for smallholders to increase their production and eventually to improve their income largely depends on their access to the credit market and their ability to compete in it (Abedullah *et al.*, 2009). Yet studies on agricultural credit indicate that smallholders have poor access to formal credit due primarily to institutional constraints (Jabber *et al.*, 2002). In contrast, farmers of larger landholdings have relatively better access to formal credit as they are able to influence financial institutions by virtue of their possession of high-value collateral such as their land and high social status (Ladman and Tinnermeir 1981).

Informal sources, including moneylenders and merchants offer credit services to farmers who do not have access to formal credit or the credit available is not adequate to meet their demand. However, informal financial institutions also tend to fragment along the lines of location, asset ownership, and membership of kin or ethnicity based networks, all affecting transaction costs of contracting, the size of the possible transaction, and the rate of interest charged (WB, 2008). Informal lenders normally do not provide loans to smallholders without repayment guarantee or collateral (Tsai, 2004). Studies of smallholders, including those concerned with access to agricultural credit, are based on either ambiguous understandings of the meaning of the term smallholders or nationally adopted operational definitions. Landholding size has commonly be used as the most suitable character for defining a smallholder. However, this may vary from country to country and from one region to another. In India for example, farmers with less than 2 ha of agricultural land are considered to be smallholders (WB, 2008) but in the Punjab province of Pakistan farmers possessing landholdings of up to 5ha are considered to be smallholders (SBP, 2010a).

Consistent with other developing countries, Nigeria has adopted a policy of providing credit to smallholders with the twin objectives of reducing rural poverty and enhancing food security (Osonduet *et al.*, 2015). In this regard, the Central Bank of Nigeria (CBN) has been mandated to provide credit to smallholders at subsidized interest rates through several public and commercial banks. However, studies of credit revealed that more than 90% of smallholders in Nigeria obtained credit from informal sources (Amjad and Hasnu 2007; ACO, 2000), indicating their poor access to formal

credit, but there is little information as to whether or how such access varies from one group of smallholders to another. Holding size, which often influences possession of assets such as livestock (Heltberg 1998; Swaminathan 1991; Binswanger and Siller 1983) and social status (Virmani 1981; Keeton 1979), play significant roles in the perception of credit worthiness, but other studies, including those of Amjad and Hasnu (2007) and Khandker and Faruquee (1999), did not analyze such factors which are essential for evaluation of any credit policy.

In order to assess whether a credit policy is effective, it is essential to evaluate smallholders' access to credit in terms of absolute amount and in relation to landholdings in a disaggregated way. Therefore this study classifies smallholders with up to five acres of holdings into three groups, namely, Benue-smallholders ( $\leq 1.5$  hectares), Nasarawa-smallholders (1.51-3.0 hectares) and Plateau-smallholders (3.51-5.00 hectares), following by in-depth analyses of access to and adequacy of credit for each group. The main objective was to ascertain whether there is a fair and adequate distribution of formal credit among the three groups. The specific objectives are to: describe the socio-economic characteristics of the respondents, determine smallholders' sources of credit, ascertain the access and adequacy of credit to smallholders, ascertain financial and non-financial cost of credit and examine the effects of socio-economic factors on approval of credit size for farmers in the study area.

II. MATERIALS AND METHODS

The study is based on a field survey carried out in North-Central Nigeria between June and August 2019. The region was selected in that, it is characterized by diverse agricultural systems including food and cash crop farming, poultry farming, and livestock husbandry. The North Central zone consists of six States including the FCT, namely; Benue, Plateau, Nasarawa, Niger, Kwara, Kogi and Abuja (FCT). The region lies between longitudes  $3^0$  and  $4^0$ E and latitudes  $7^030'$  and  $11^0 20'$ N and occupies a landmass of about 296, 898  $Km^2$  (FAO, 2004). The population of the region is estimated at 21, 566, 993 million people (NPC, 2007). The average annual rainfall in the zone is estimated at 14000mm with high relative humidity and temperature of  $15^0$ C.

Purposive sampling technique was used to draw the sample due to lack of official information on smallholders in the study area. There are 5537 smallholders households in North-Central Nigeria with landholdings of up to 5 hectares. By using Yamane's formula (1967), a sample size of 556 smallholder households was determined at 95% confidence level and  $\pm 7\%$  margin of error but, in actuality, 556 households were surveyed. Then 18 communities, 6 in each State were selected for household surveys. Corresponding to a total number of households in each state, 206 households were surveyed in Benue state, 127 households in Nasarawa State and 133 households in Plateau State. In this study, farmers possessing landholdings up to 5 hectares are considered as smallholders (SBP, 2010a). Smallholders' landholdings in the

area ranged between  $\leq 1.0$  hectares to 5.0 hectares. Data were collected using questionnaires. Supplementary information was collected from smallholders through individual discussions. Necessary information on mechanism of credit delivery and pertinent issues were collected from financial institutions that extended credit services in the study area. Information was also collected from a few informal moneylenders. The tools of data analysis were descriptive and inferential statistics.

Model Specification

I. Access to credit

Following Amjad and Hasnu (2007) and Malik et al. (1989), access to credit of smallholders in the study areas was analyzed using the formula:

$$AC = \frac{c}{C} \cdot \frac{I}{L} \dots\dots\dots (1)$$

Where:

AC= Access to credit

c = Total amount of credit given to smallholders in each State

C = Total amount of credit disbursed to all smallholders across the States

I = Total landholdings belonging to smallholders in each State

L = Total landholdings belonging to all smallholders across the States

The result of the analysis based on the above formula shows each State smallholder's relative access to credit as compared to the average access to credit by all smallholders across the States, and it can be interpreted as follows:

- = 1 Smallholders' access to credit is equal to average access to credit
- < 1 Smallholders' access to credit is less than average access to credit
- > 1 Smallholders' access to credit is more than average access to credit

II. Adequacy of credit

Smallholder farmers can only obtain the required amount of credit if they do not have any constraints (Cox and Jappelli 1993). In reality, they are confronted with many constraints, resulting in difference between credit demand and supply, conventionally known as the credit gap (Hou 2006). To investigate the credit gap, a credit adequacy ratio was calculated for all three groups of smallholders using the following formula:

$$CAR = \frac{S}{D} \times 100 \dots\dots\dots (2)$$

Where:

CAR = Smallholders' Credit Adequacy Ratio

$\hat{S}$  = Annual average amount of credit demanded by smallholders in each State

$$\hat{S} = \sum_{i=1}^n S / n \dots\dots\dots (3)$$

n = number of smallholders in each State

D = Annual average amount of credit demanded by smallholders in each State

$$D = \sum_{i=1}^n D / n \dots\dots\dots (4)$$

CAR analyzes the distribution of the smallholders' formal and informal credit across the States, irrespective of type of credit they are receiving.

*III. Multiple Regression*

The multiple regression using the least square estimation technique was used to determine the effects of socio-economic characteristics on accessibility of agricultural credit. The functional relationship is stated as:

$$Y = f( X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9) + \varepsilon \dots\dots (5)$$

The model is specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \varepsilon \dots\dots\dots (6)$$

Where:

Y = access to agricultural credit (amount of credit received)

X<sub>1</sub> = age of the farmer (years)

X<sub>2</sub> =sex (male =1, female = 2)

X<sub>3</sub> = marital status (married =1, single =0)

X<sub>4</sub> = family size (number per household)

X<sub>5</sub> =level of education (no. of years in school)

X<sub>6</sub> =farm size (hectares)

X<sub>7</sub> =previous credit (Yes =1, No =0)

X<sub>8</sub> = income (₦)

X<sub>9</sub> =Farming experience (years)

β<sub>0</sub> = intercept

β<sub>1</sub> - β<sub>9</sub> = the coefficients

ε = disturbance error term

III. RESULTS AND DISCUSSION

*Socio-economic Characteristics of Respondents*

Table 2 showed the socio-economic characteristics of respondents in the study area. Most (72.7%) of the respondents that acquired external agricultural credit were males and 27.3% were females. The result underlies the fact that males in the study area had greater access to production resources. The male dominance in this rural source of livelihood implies the laborious nature of farming operations which their female counterparts cannot easily undertake. This agrees the finding of Asogwa et al. (2014) that small-scale farming is been carried out mostly by males, while females involve in light farm operations such as processing, harvesting and marketing

Majority (82.6%) of the respondents were married and therefore would have greater family responsibility. The average age of the respondents was 46.4 years, implying that majority of the respondents can actively and effectively use their energies on agricultural and economic activities. Majority (70.2%) of the respondents were educated and the average number of years spent in school was 7.0 years. As the years of schooling increased, it was expected that the majority of these respondents will be articulate enough in their decision making process, managerial skills and high level of awareness of credit facilities, for increased, sustainable and profitable production. The results revealed that the average household size of the respondents was 10 persons. This result is contrary to the findings of Awoniyet al. (2012), who reported average household size of 5.5 in Niger State of Nigeria.

The high household size in the study area will help the farmers to spend less money hiring laborers as large households tend to use family members as sources of labor. This is in agreement with Osondu et al. (2015), who stated that in the presence of constraints to farm labor availability, large households tend to use family members as sources of labor. In this case, credit obtained could be efficiently utilized for agricultural productivity. The mean farm size was 3.0hectares implying that farmers in the study area had relatively small farm holdings and hence were small scale farmers. The result agrees with the findings of Olawepo (2010), who found that over 90% of the Nigeria's local food production comes from small scale farms usually not more than 5.0 hectares. The mean annual farm income of households was (₦188, 541.45)indicating low income earning. The table further shows that majority (33.75%) of the farmers borrowed between ₦100, 000- ₦150, 000 with few (5.65%), borrowing up to ₦200, 000.

Table 1: Socio-economic Characteristics of Respondents

	<b>n = 206</b>	<b>n = 217</b>	<b>n = 133</b>	<b>n = 556</b>
<b>Variables</b>	<b>Benue state</b>	<b>Nasarawa state</b>	<b>Plateau state</b>	<b>Pooled sample</b>
<b>Sex</b>				
Male	76.0	65.0	80.3	72.7
Female	24.0	35.0	19.7	27.3
<b>Age (years)</b>				
20 – 24	3.6	8.6	4.8	5.8
25 – 29	10.0	6.7	7.0	8.0
30 – 34	8.2	12.0	8.5	9.8
35 – 39	12.1	7.5	9.5	9.7
40 – 44	11.2	13.0	13.0	12.3
45 – 49	9.8	9.0	10.6	9.7
≥50	35.1	43.2	46.6	44.7
<b>Average</b>	<b>45.9</b>	<b>46.9</b>	<b>46.3</b>	<b>46.4</b>
<b>Marital Status</b>				
Single	8	6	5	6.5
Married	75	85.2	90.1	82.6
Widow	11.5	5.5	4	7.3
Others	5.5	3.3	0.9	3.6
<b>Years spent in school</b>				
0	22.5	33.5	35	29.8
6-Jan	30	26.5	26	27.7
12-Jul	38	20.5	24.5	27.9
>12	9.5	19.5	14.5	14.6
<b>Average</b>	<b>7.8</b>	<b>6.6</b>	<b>6.5</b>	<b>7</b>
<b>Household size</b>				
1 – 5	20	21.5	25	21.78
6 – 10	39.5	45.5	48	43.88
11 – 15	22	25	16.5	21.86
>15	18.5	8	10.5	12.49
<b>Average</b>	<b>11</b>	<b>10</b>	<b>10</b>	<b>10</b>
<b>Farm size (ha)</b>				
0.5 – 2.5	46	44.5	45	45.2
3.5 – 5.5	35	33.5	30	33.2
6.5 – 8.5	12.5	14	18	14.4
9.5 – 11.5	4.5	5	6	5.1
≥12.5	2	3	1	2.2
<b>Average</b>	<b>1.4</b>	<b>3</b>	<b>4.4</b>	<b>3</b>
<b>Amount borrowed (₦)</b>				
50,000 – 100,000	28.5	25.5	27	26.97
100,001 – 150,000	33.5	32	37	33.75
150,001 – 200,000	4	7	6	5.65
<b>Annual Farm income (₦)</b>				
50,000 – 100,000	4	7	6	5.65
100,001 – 150,000	28.5	25.5	27	26.97
150,001 – 200,000	33.5	32	37	33.75
200,001 – 250,000	23.5	22	1.5	17.65
250,001 – 300,000	3.5	8.5	2.5	5.21
>300,000	7	5	26	10.77
<b>Average</b>	<b>184,466.50</b>	<b>183,525.81</b>	<b>197,632.05</b>	<b>188,541.45</b>

Source: Survey Data, 2020.

### Sources of Agricultural Credit

Formal financial institutions (FFIs) such as commercial banks, Bank of Agriculture (BOA), and Microfinance banks are the sources of credit to farmers in the study area while informal sources included money lenders, friends/ relatives and Cooperative societies. Table 2 shows that the main type of credit available to the farmers in the study area was informal credit with 74% of smallholders accessing this source across the States as compared to 26% accessing credit exclusively from formal sources. The implication is that credit from non-institutional sources is more attractive, because there is little or no insistence on collateral security. In other words, formal sources of credit had low patronage from the farmers, which may be due to delay in approval and disbursement of loan and insistence of collateral security. Smallholders have to follow a long and complex process to obtain formal credits with collateral and valuable asset like landholdings playing vital role in accessing formal credits. In the case of informal credit, some financial lenders provide credit based on a verbal agreement on the interest rate and payback period and in some cases, the borrower have to produce one or two witnesses and the credit has to be paid back within a mutually agreed period of time.

This is consistent with Ali et al. (2017) who observed the credit from formal institutions meet only a small portion of the total credit demand of the agricultural sector.

The results further revealed that on average, the volume of credit received by smallholders from informal source across the States was higher compared to that obtained exclusively from formal sources thus, indicating their better access to informal rather than formal credit. Around 28 percent of smallholders across the States obtained credit partially from both formal and informal sources. Specifically, there was high percentage of smallholders in Plateau State who depend exclusively on informal credit as compared to smallholders in Benue and Nasarawa States. The relative amounts of credit received is also higher. However, most smallholders complained that the amount of credit received from formal sources for agricultural production was not sufficient for meaningful investment in agriculture. This has a negative implication because for a farmer to derive benefits from any formal credit institution, the size of the credit is very important as it to some extent determines the farmer's ability to adopt new innovation that can increase his productivity and hence income.

Table 2: Sources of Credit to Smallholders in the Study Area

Type of credit	Credit sources	Benue State (n=206)		Nasarawa State (n=217)		Plateau State (n=133)	
		N0. of Farmers	Total credit received/yr.	N0. of farmers	Total credit received/yr.	N0.of farmers	Total credit received/yr.
Exclusively formal	Microfinance bank	6	3000	12	2894	18	9500
	Agric.Development bank	10	7000	6	2000	16	7200
	Commercial bank	4	1080	18	18000	8	6300
	Rural community bank	9	6000	10	2206	5	10500
	<b>Total farmers/Average credit received</b>	<b>29(14)*</b>	<b>17080</b>	<b>46(21)</b>	<b>25100</b>	<b>42(32)</b>	<b>33500</b>
Exclusively informal	Cooperative society	60	32300	40	42000	30	20000
	Friends and relatives	21	30000	22	30000	13	29556
	Money lenders	40	20055	38	11699	37	80000
<b>Table 2: Cont'd.</b>							
	<b>Total farmers/Average credit received</b>	<b>121(59)</b>	<b>82355</b>	<b>63(29)</b>	<b>76012</b>	<b>80(60)</b>	<b>129556</b>
<b>Partial credit from both sources</b>	<b>Total farmers/Average</b>	<b>56(27)</b>	<b>1002</b>	<b>108(50)</b>	<b>1782</b>	<b>11(08)</b>	<b>4914</b>
<b>Average amount of credit received</b>		<b>100437</b>		<b>102894</b>		<b>167970</b>	

Source: Survey Data, 2020. \*Note: figures in ( ) shows ratio of farmers e.g. exclusively formal=29/206 x 100 =14%.

### Smallholders' Access to Credit

Results in Table 3 showed that smallholders in Benue State have a share of about 19 percent of the total formal credit and 38 percent of the total informal credit received by all the smallholders across the three States. When this amount of credit received is compared against their landholdings, it was observed that they have below average access to formal credit, with access ratio of 0.84, but above average access to informal credit, with an access ratio of 1.46.

Smallholders in Nasarawa State account for 51 percent of the total formal credit and 33 percent of the total informal credit reflecting their better access to informal credit. When their access to credit in relation to landholdings is considered, it is slightly less than average to formal credit (0.96) and slightly more to informal credit (1.07). Regarding smallholders in Plateau State, they account for the major share of the total of both formal and informal credit in absolute term. Their access to formal credit in relation to their landholdings is higher than the average (1.11), and lower than the average to informal

credit (0.81). The study showed smallholders are constrained with regards to obtaining credit for the purchase of farm inputs for investment in farm development. The amount of credit that financial institutions provide depends on the value of assets, normally farmlands and buildings that can be used

as collateral. The very limited access of smallholders to formal credit has not only to do with low value of their assets to be used as collateral but also the complicated, lengthy and costly process of credit application

Table 3: Credit Access in the Study Area

Smallholders by State	Share of State's formal credit to total formal credit (%)	Share of State's informal credit to total informal credit (%)	Share of land owned by formal borrowers to total land of all the formal borrowers (%)	Share of land owned by informal borrowers to total land of all the informal borrowers (%)	Credit access ratio	
					$\frac{\text{formal}}{\text{informal}}$	$\frac{\text{Ac}_f}{\text{Ac}_i}$
Benue	19	38	23	26	0.84	1.46
Nasarawa	51	33	53	31	0.96	1.07
Plateau	60	59	54	73	1.11	0.81

Source: Survey Data, 2020

#### Financial and Non-financial Cost of Credit

Smallholders incur financial and non-financial cost of credit. The interest and non-interest cost (legal and illegal financial payments) made for credit are financial costs, while the duration of the time involved in getting the request for the credit approved is a non-financial cost. According to Serap (1990), the cost of obtaining credit is a considerable influence on smallholders' access. As regards non-financial cost, Table 4 showed that it takes, it takes 26-28 days on the average for the entire process of getting the application for formal credit processed and approved. It is time consuming and often involves financial cost such as those for transportation. Even though, the interest to be paid is the main financial cost of credit, smallholders also have to bear other costs such as fees for certification and formal credit agreement documents.

Irrespective of type of borrower, obtaining formal credit requires significantly more time than obtaining informal credit. Variation among the smallholders in the three States in

time taken to obtain credit from either source was significant: 5-7 days for informal credit and 22-24 days for formal credit. However, the financial cost of the interest on formal credit across the States is about 50% lower than that of the informal credit but this is to some extent balanced by the costs involved in obtaining it. The cost differential is lowest for smallholders in Benue State and highest for smallholders in Plateau State, indicating a tendency towards increasing cost differential with increasing holding size. This is attributed to the higher interest on the larger credit that smallholders in Plateau State obtained. Smallholders in Benue State who need relatively small amount of credit, pay interest at a relatively low rate. The study showed that though the interest on formal credit is considerably less than the interest on informal credit. However, there are also some disadvantages of informal credit. Informal credit lenders charge smallholders very high interest rate, such high interest is capable to leave smallholders with very little net income.

Table 4: Financial and Non-financial Cost of Credit in the Study Area

Smallholders by State	Credit source	Days required to get credit	Average interest rate	Other financial cost (% of credit)	Total financial cost (% of credit)	Differential cost (%) (cost of informal credit – cost of formal credit)
Benue	Formal	25	14	8.4	22.4	7.6
	Informal	05	30	0.0	30.0	
Nasarawa	Formal	26	16	4.8	20.8	9.2
	Informal	05	30	0.0	30.0	
Plateau	Formal	28	18	6.0	24.0	10.0
	Informal	07	34	0.0	34.0	

Source: Survey Data, 2020

#### Credit Adequacy

Table 5 showed that smallholders in Benue and Nasarawa States need an annual average credit of about ₦180, 820 and ₦175, 250, respectively so as to purchase mainly agricultural inputs including fertilizer, seeds and others. Smallholders in Plateau State need about ₦182, 019 as credit so as to be able

to purchase small machines or tractor for ploughing. Thus, in Plateau State, smallholders' demand for credit is much higher than that of smallholders in Benue and Nasarawa States. The results showed that smallholders in Benue State meet only 10% of their demand for formal credit. Therefore, these smallholders have to seek informal sources but this only meets

46% of the credit demand, giving a total of 56%. This implies that 44 percent of the smallholders' demand for credit in Benue State remains unmet.

In Nasarawa State, smallholders' demand met 15% of the demand for credit through formal sources and 44% through

informal sources thus, leaving a credit gap of 41%. Smallholders in Plateau State met 21% of credit demand through formal sources, which is a bit lower than that of smallholders in Nasarawa State but higher than that of smallholders in Benue State, 71% through informal sources, leaving a credit gap of 8.0%.

Table 5: Credit Adequacy in the Study Area

Smallholders by State	Naira / household/ year							
	Credit Demand $D$	Formal credit received $S_f$	Informal credit received $S_{in}$	Credit received(formal + informal) $S_t$	Adequacy of formal credit (%) $R_1=(S_f/D) \times 100$	Adequacy of total credit (%) $R_2=(S_t/D) \times 100$	Gap filled by informal credit (%) $R_2 - R_1$	Credit gap/credit inadequacy (%) $100 - R_2$
Benue	180820	18082	82355	100437	10	56	46	44
Nasarawa	175250	26882	76012	102894	15	59	44	41
Plateau	182019	38414	129556	167970	21	92	71	8

Source: Survey Data, 2020

#### Socio-economic Determinants of Size of Credit

Table 6 showed the regression estimates of the determinants of credit size received by smallholders. Out of the four functional forms of regression models, the exponential function gave the best fit with  $R^2$  of 0.89 implying that 89% of the dependent variable was explained by the explanatory variables. The F-value was also significant ( $P \leq 0.01$ ), indicating the collective significance of the explanatory variables on the dependent variable.

The coefficient of income is positive and statistically significant ( $p \leq 0.01$ ) implying that high income earners received larger amounts of credit than low-income earners. This may be explained by their perceived influence in credit negotiations and promised ability to pay back. The coefficient of farm size was positively correlated with the size of credit obtained and significant ( $p \leq 0.01$ ) implying that the credit size increases with size of the smallholders' farm. This agrees with the findings of Ekpe et al. (2000) who observed that farm size is one the strong factors usually considered by financial institutions in determining credit size for farmers.

The evidence of previous credit had positive sign and statistically significant ( $p \leq 0.01$ ) meaning that previous credit beneficiaries were more likely to access larger credit size than first beneficiaries. This may be so because lending institutions rely on previous performance of prospective borrowers as one of the major determinants of volume of credit to be approved for them. The level of education has a positive coefficient and was significant ( $p = 0.05$ ). The amount of credit received therefore increases with increase in level of education. The

possible explanation is that farmers with higher level of education may be working to earn additional income to increase their farm size which attracts the financial institutions to grant larger amount of credit. The coefficient of marital status is negative but was statistically significant ( $p = 0.05$ ). This implies that married people received smaller amount as credit. A possible explanation of this is that, married people are always saddled with heavier family responsibilities such that they often give less attention in investing in capital assets that are mostly required as collateral in securing loans. Farming experience was positively related to the amount of credit received and was significant ( $p = 0.05$ ). This implies that priority attention was given to farmers with relatively high experience in farming since their cumulative knowledge in farming will enhance their productivity and income and will be able to pay back the credit and hence, were give larger amount of credit.

Age, sex and household size all had positive coefficients but were not significant. This implies that farm size tend to increase with age up to a certain level and as a corollary, credit size increases with age. The positive sign of sex implies that male beneficiaries tend to be granted higher volume of credit than their female counterparts. This may be due to the fact that male farmers are major decision makers and titleholder to farmland in Africa as opined by Okojie (1983). The coefficient of household size is positive but was not significant, implying that lending officials may have considered his as a reliable source of family labor and hence the tendency to approve higher amount of credit for these applicants with higher household size.

Table 6: Summary of Regression Analysis of Socio-economic Determinants on Credit Size Received

Variables	Linear function		Exponential function		Semi-log function		Double-log function	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant	1288.67	13872.53	8.17	0.12	-212084.0	77358.2	2.658	0657
X <sub>1</sub> (Age)	1612.68	151.187	0.003	0.002	-7166.82	41368.68	-0.153	0.309
X <sub>2</sub> (Sex)	3120.042	4636.68	0.04	0.044	5138.12	5001.72	4.73x10 <sup>-2</sup>	0.307
X <sub>3</sub> (M-status)	221.317	45.564*	0.002	0.000*	25358.1	5768.78*	0.261	0.044*
X <sub>4</sub> (HH size)	126.14	630.55	3.5x10 <sup>-3</sup>	0.005	-10448	13875.34	3.31x10 <sup>-2</sup>	0.104
<b>Table 6: Ctd.</b>								
X <sub>5</sub> (Edu.)	566.75	407.156	0.005	0.003	31776.8	17765.34	0.242	0.134
X <sub>6</sub> (Farm size)	4345.88	1900.5**	0.003	0.015**	57527.13	13161.99*	0.433	0.088*
X <sub>7</sub> (Prev. loan)	1.043	0.101*	0.00008	0.000*	3597.140	1423.77**	4.77x10 <sup>-2</sup>	0.012*
X <sub>8</sub> (income)	6.24x10 <sup>-2</sup>	0.018*	5.6X10 <sup>-7</sup>	0.000*	44162.55	11160.02*	0.360	0.073*
X <sub>9</sub> (Farm. exp.)	1.161	0.033*	0.904	0.002*	7921.28	1132.44*	3.2x10 <sup>-4</sup>	0.021*
R <sup>2</sup>	0.773		0.892		0.717		0.564	
Adjusted R <sup>2</sup>	0.764		0.811		0.711		0.516	
F-value	22.128		22.727		7.815		12.358	

Source: Survey Data, 2020. \*\* ( $P \leq 0.01$ ), \* ( $P \leq 0.05$ ).

#### IV. CONCLUSION

Formal financial institutions in North-Central Nigeria have been providing credit to smallholders as part of National policy of enhancing smallholders' food security through the provision of credit. Nevertheless, the study found that these financial institutions have not been able to provide credit effectively across the study areas as the smallholders' formal credit accounts very meagre of the total credit they obtained.

As a result, smallholders have continued to depend overwhelmingly on informal credit which often do not meet the smallholders' credit demand as it is often characteristics with high interest rates. This situation is not conducive to achieving the overarching objective of enhancing smallholders' food security through the provision of credit. This therefore, calls for the government needs to pay attention to enhancing access to formal credit by smallholders in general so as to actualize the policy objective.

#### V. RECOMMENDATIONS

Based on the findings, the following recommendations are pertinent

1. Priority should be given to simplifying and shortening the credit processing period
2. They should be more focus on supervision to minimize chances of defaulters as a consequence of simplified processing
3. There is need for simple application processing and elimination of various charges other than interest and application fees to enhance smallholders' access to credit, thereby narrowing the credit gap and enhancing agricultural production

#### REFERENCES

- [1] Abedullah, M. N., Khalid, M. and Kouser, S. (2009). Role of agriculture credit in the growth of livestock sector: A case study of Faisalabad. *Pakistan Veterinary Journal*, 29(2): 81-84.
- [2] Agricultural Census Organization [ACO] (2000). Census of agriculture Statistics Division, Government of Pakistan.
- [3] Ali, B. M., Agbo, F. U., Ukwuaba, I. C. and Chiemela, C. J. (2017). The effects of interest rates on access to agro-credit by farmers in Kaduna State, Nigeria. *African Journal of Agricultural Research*, 12(43): 3160-3168.
- [4] Amjid, S. and Hasnu, S. A. F. (2007). Smallholders' access to rural credit: Evidence from Pakistan. *The Lahore Journal of Economics*, 12(2): 1-25.
- [5] Asogwa, B. C., Abu, O. and Ochoche, G. (2014). Analysis of Peasant Farmers' Access to Agricultural Credit in Benue State, Nigeria. *British Journal of Economics, Management and Trade*, 4(10): 1535-1543.
- [6] Awoniyi, S.O.M., Amos, T.T. and Omole, M.M. (2012). "Rice famers' productivity in Nigeria": How has malaria not helped International Food Policy Research Institute? Discussion Paper, Washington DC, 2006-1007
- [7] Binswanger, H. P. and Siller, D. A. (1983). Risk aversion and credit constraints in farmers' decision making: A reinterpretation. *Journal of Development Studies*, 9(2): 5-21.
- [8] Cox, D. and Jappelli, T. (1993). The effect of borrowing constraints on consumer liabilities. *Journal of Money, Credit and Banking*, 25(2): 197-213.
- [9] Ekpe, E. E., Idiong, I. C. and Chinemerem, O. (2000). The role of formal institutions in financing small-scale agricultural production in Benue State, Nigeria. *Journal of Agribusiness and Rural Development*, 1(1): 12-23
- [10] Ellis, F. (1992). *Agriculture policies in developing countries*. Book Chapter No. 7. Credit Policy Pp. 152-174. Cambridge University Press.
- [11] Food and Agricultural Organization of the United Nations (FAO) (2004). Trans-boundary Animal Diseases: assessment of socio-economic impacts and institutional responses. Livestock Policy Discussion Paper No. 9. Livestock Information and Policy Branch, AGAL, February, 2004. Pp 48



- [12] Heltberg, R. (1998). Rural market imperfections and the farm-size productivity relationship: Evidence from Pakistan. *World Development*, 26(10): 1807-1826.
- [13] Hou, J. (2006). *A measurement of the small business credit gap and the use of credit scoring by small financial institutions*. Ph.D. dissertation, University of Kentucky, UK.
- [14] Imai, K. S., Arun, T. and Annim, A. K. (2010). Household poverty reduction: New evidence from India. *World Development*, 38(10): 1760-1774.
- [15] Jabber, M. A., Ehuui, S. and Van Kaufmann, R. (2002). Supply and demand for livestock credit in sub-Saharan Africa: Lessons for designing new credit schemes. *World Development*, 30(6): 1029-1042.
- [16] Jiang, Y.S. and Braun, J. (2005). The economic cost of illness and household coping strategies in Western rural China, *Chinese Rural Economy*, 11:3-39.
- [17] Keeton, W. (1979). *Equilibrium credit rationing*. New York. Garland Publication.
- [18] Khandker, S. R. and Faruquee, R. R. (1999). *The impact of farm credit in Pakistan*. World Bank Policy Research Working Paper No. 2653
- [19] Ladman, J. R. and Tinnermeir, R. L. (1981). The political economy of agriculture credit: The case of Bolivia. *American Journal of Agricultural Economics*, 63(1): 66-72.
- [20] Malik, S. J., Mushtag, M. and Gill, M. A. (1989). Differential access and rural credit markets in Pakistan. *Pakistan Development Review*, 28(4): 708-716.
- [21] National Population Commission, (NPC, 2006). National Population Census Report, Abuja.
- [22] Okojie, C. E. E. (1983). Improving the quality of life for rural women in Nigeria: The role of education and technology. In ARMT Seminar Series, 3: 130-135
- [23] Olawepo, R.A. (2010). Determining farmers' income: A rural Nigeria experience. *Journal of African Studies and Development*, 2(4): 99-108
- [24] Osondu, C. K., Ogbonna, S. I. and Emerole, C. O. (2015). Level and Determinants of Women Farmers Access to Informal Credit in Abia State, Nigeria. *Asian Journal of Agricultural Extension, Economics and Sociology*, 7(1): 1-10.
- [25] Russell, S. (2004). The Economic burden of illness for households in developing countries: A review of studies focusing on Malaria, Tuberculosis, Onchocerciasis and Human Immunodeficiency virus (Acquired Immuno-deficiency Syndrome). *American Journal of Tropical Medicine and Hygiene* 71 (suppl. 2): 147 – 155.
- [26] Sarap, K. (1990). Factors affecting small farmers' access to institutional credit in rural Orissa, India. *Development and Change*, 21(2): 281-307.
- [27] State Bank of Pakistan [SBP] (2010a). *Document of definitions, agricultural credit department*. Karachi: State Bank of Pakistan.
- [28] Swannathan, M. (1991). Segmentation, collateral undervalued and the rate of interest in the agrarian credit markets: Some evidence from two villages in South India. *Cambridge Journal of Economics*, 15(2): 161-178.
- [29] Tsai, K. (2004). Imperfect substitutes: The local political economy of informal finance and micro credit in rural China and India. *World Development*, 32(9): 1487-1507.
- [30] Vermani, A. (1981). The nature of credit markets in less developed countries. *A framework for policy analysis*. Domestic Finance Study No. 71, World Bank, Development Economics Department.
- [31] World Bank [WB] (2008). *Agriculture for Development*. World development report 2008. Washington: The World Bank.
- [32] Yammane, T. (1967). *Statistics, an introductory analysis*. (2<sup>nd</sup>Ed.). New York: Harper and Row.