Full Length Research Paper

Credit supply and resource productivity among farmers group link to banks in Adamawa State, Nigeria

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Lending to small-scale farmers has been an important policy measure to stimulate agricultural development in Nigeria. In Adamawa state, small-scale farmers constitute the larger percentage of farmers groups. This study examined the relationship between credit supply and farm revenue among members of farmers group linked to banks for credit delivery in Mubi region. Findings revealed that the credit group members were predominantly of middle age between 30 and 44 years. 5 commercial banks were found to be their major source of credit at an average interest rate of 30% per annum. The result of correlation analysis shows that there is a weak relationship (0.350) between credit supply and farm revenue, while the regression analysis showed that credit supply, cost of credit, cost of fertilizer, seeds and family labour had positive and significant relationship with farm revenue. A decrease returns to scale (0.81) was found to exist in the farm enterprise of credit group members in the region. On the basis of a positive and significant but weak relationship between credit supply and farm revenue, it was recommended that larger volume of credit be made available to farmers' credit groups for enhanced agricultural productivity.

Key words: Credit supply, farmers group, productivity, revenue, regression analysis.

INTRODUCTION

To stimulate agricultural development in Nigeria, it is a general belief that the provision of credit is a precondition for technological change among the rural and small-scale farmers who constitute 70% of the country's population. As such, over the years government has fostered the growth of rural financial markets to provide concessionary credit to farmers but minimal result was observed.

The food and agricultural organization (FAO, 1999) reported that the financial sector reforms during the late 1980 have caused a decline in the flow of credit to agricultural sector of most developing countries. In Nigeria, donor agencies withheld or cut down aid drastically; unviable institutions were closed down or restructured while, treasury managers sought for less risky exposures outside agriculture and rural enterprise (Usman, 2000).

Being faced with the challenge to finance viable agricultural investment of small-scale farmers in a new market environment, the central bank of Nigeria (CBN) in 1991 introduced the self-help groups' linkage programme into the country's financial system to operate under the agricultural credit guarantee scheme (ACGS). Essenwah (1998) stated that this programme aims to foster mutual business relationship between commercial banks and small-scale farmers organised as self help groups. The strategy, he further stressed, incorporates savings mobilization as an integral part of credit delivery at market determined rate of economical provision of the production needs of small-scale farmers.

Despite the fact that linkage programme is a potential medium for disbursing significant proportion of credit to agriculture in the country, no work has been done on the factors affecting credit group members in their use of farm credit in Adamawa state. Most works relating to credit groups under the linkage programme are simply reports on the programme outreach. These are not enough to resolve the problem of credit fungibility in rural and agricultural finance. Adetumbi (2000) stated that rural and agricultural finance is a specialized field which banks

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do not have expertise to display, and their cost structures and inexperience in assessing the risk of this market preclude them from providing the services required.

It is for this reasons that this study aims to examine the existing practice of lending credit to farmers in groups so as to access how it can be adopted and utilized by intermediate financial services to small-scale farmers. It will assist government and commercial banks to become aware of the problems militating against the development of agricultural credit programmes and strategies to adopt in solving them.

The objectives of the study are:

1. To evaluate the socio-economic characteristics of the members of the credit groups.
2. To identify the source of credit and outreach to group members.
3. To examine the relationship between agricultural credit supply and other production inputs factors.
4. To examine the nature of return to scale among credit group farmers.
5. To identify and isolate those factors which brings about some basic variability in farm revenue and income and suggest measures necessary for enhanced productivity among credit members.

MATERIALS AND METHODS

A multi stage sampling technique was adopted for the study. 4 local governments in Mubi region (Michika, Mubi North, Mubi south and Maiha local governments) were purposively selected due to high number of farmers group in the area. From each local government, 2 districts Garta and Vi, Kirya and Mayobani, Lamurde and Dribeshi, Pakka and Humbotudi from Michika, Mubi North, Mubi South and Maiha, respectively were chosen.

Data were collected using structured questionnaires and interview schedule administered to 103 members of farm credit groups. Descriptive (frequency and percentage) was used to describe the socio-economic characteristics of the respondents as well as programme outreach of the banks to the respondents while, inferential statistics included parametric correlation between agricultural credit and other farm input factors. The production function analysis was through the use of multiple regression technique to access the productivity of credit supply to respondents as well as factors affecting it and also for the estimation of return to scale in agriculture among members of credit groups.

Four functional forms namely linear, semi-logarithm, double logarithm and Cobb Douglas functions were fitted to the data in order to determine the equation with best fit. The functional regression equations are:

Linear function,

$$\pi = \beta_0 + \beta_1 X_2 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + U_1$$

Double-log function,

$$L_n\pi = l_n\beta_0 + \beta_1 l_n X_2 + \beta_2 l_n X_2 + \beta_3 l_n X_3 + \beta_4 l_n X_4 + \beta_5 l_n X_5 + \beta_6 l_n X_6 + \beta_7 l_n X_7 + \beta_8 l_n X_8 + U_1$$

Semi-log function

$$\pi = l_n\beta_0 + \beta_1 l_n X_2 + \beta_2 l_n X_2 + \beta_3 l_n X_3 + \beta_4 l_n X_4 + \beta_5 l_n X_5 + \beta_6 l_n X_6 + \beta_7 l_n X_7 + \beta_8 l_n X_8 + U_1$$

Exponential function

$$L_n\pi = \beta_0 + \beta_1 X_2 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + U_1$$

Where, Π = Farm revenue in Naira, X_1 = Farming Experience in Years, X_2 = Family Labour in Mondays, X_3 = Farm Size in hectares , X_4 = Household Size in Numbers, X_5 = Cost of Fertilizer and Seeds, X_6 = Cost of Hired Labour in Naira, X_7 = Cost of Credit in Naira, X_8 = Credit supply in Naira, β_0 = Interest, β_0 - β_8 = Coefficient of the independent variables, U_1 = Error term

However, the data were subjected to stepwise multiple regression analysis. Criteria for selection included; statistical, econometric and economic.

RESULTS AND DISCUSSION

Table 1 shows the socio-economic characteristics of the respondents. The age distribution of the respondents revealed that majority (56%) of the farmers was between 30 - 44 years. 78% of the respondents interviewed are of the male sex as compared to the female sex (22%). This shows that majority of the farmer's group members were male; males involvement in agricultural production are high as compared to females. This study indicates that most of the respondents were married (85%) and to a lesser extent 5% were single. Respondents with house-hold size of 9 - 11, 6 - 8 and 3 – 5, represented 39, 33 and 19%, respectively of the respondents interviewed. The large families which dominated among farmers of farm credit groups may imply cheap land and readily available family labour. About 62% of the respondents interviewed had educational qualification above primary school leaving certificate. This development may likely enhance the adoption of modern agricultural technolo-gies. The socio-economic characteristics of the respon-dents further revealed that majority (76%) of the farmers were into crop and livestock farming and a small percentage (7%) were livestock farmers.

The preponderance of the members of farm credit groups in mixed farming (crop and livestock) may be associated with the desirability to secure security against crop or livestock failure. The findings in this work show that respondents with farm sizes of 2 - 4 ha represented 65%. This is a clear indication that the members of farm credit groups are into small-scale farming. The impli-cation of this size of farm holdings reflects the pattern of land tenure system and the small holding farming system among members of credit groups.

The study revealed that 33% of the total credit disbursed was from union bank plc to 36 farmers which make up 35% of the total respondents (Table 2). Also, first bank plc disbursed 24% of the credit to 21 farmers (20%), UBA plc disbursed 12% of the total credit to 15% of the respondents and unity bank disbursed 15% of the total credit to 10 farmers. Lastly, afribank plc disbursed

Table 1. Socio- economic characteristic of the respondent.

Variables	Frequency	Percentage
Age		
< 30	8	8
30 - 44	49	48
45 - 59	28	27
> 60	18	17
Sex		
Male	80	78
Female	23	22
Marital status		
Single	4	4
Married	88	85
Widowed	11	11
Household size		
0 - 2	5	5
3 - 5	20	19
6 - 8	34	33
9 - 11	40	39
12 - 14	4	4
Educational qualification		
No formal education	12	12
Adult education	6	6
Primary education	21	20
Secondary education	54	52
Tertiary education	10	10
Types of farming		
Crop farming	18	17
Livestock	7	7
Crop and Livestock	78	76
Farm size (ha)		
1	7	7
2- 4	67	65
4-6	18	17
7 >	11	11

Source: Field survey, 2007.

16% of the total credit to 19 farmers. The interest rate charged on credit disbursed to members of credit groups was uniform among banks (Table 2). This may be that it is determined by the managing agent of the agricultural credit guarantee scheme (ACGS) for adoption by all participating banks. Interest rates have direct effect on the cost of credit to farmers. This also confirms that the 30% interest rates on credit to small-scale farmers is actually market determined Table 3 shows the range of credit received by the respondents for farm production in the season. It revealed that majority (52%) of the respondents received less than N10,000, 32% of them received farm credit between N11,000 – N20,000 while 12% of the respondents received credit between N21,000 – N30,000 and only 4 farmers received between N31,000 – N40,000.

Table 2. Distribution of banks credit among respondents and average interest on credit.

Source of credit	Credit disbursed (N)	Percentage (%)	Interest rate (% per annum)	Numbers of farmers	Percentage (%)
Union bank plc	303,996	33	30	36	35
First bank plc	221,088	24	30	21	20
UBA plc	110,544	12	30	15	15
Unity bank plc	138, 180	15	30	10	10
Afribank plc	147,382	16	30	19	18
Total	921,200	100		103	100

Source: Field survey, 2007. N= Naira (Nigerian currency).

Table 3. Range of credit received by respondents.

Amount	Farmers	Percentage (%)
<10,000	54	52
11,000 - 20,000	32	31
21,000 - 30,000	13	13
31,000 - 40,000	4	4
Total	103	100

Source: Field survey, 2007.

Table 4. Correlation coefficient of the variables.

Variables	π	X_1	X_2	X_3	X_4	X_5	X_6	X_7
Farming experience (years) X_1	0.158							
Family iabour (Mondays) X_2	0.251	0.108						
Farm size (ha) X_3	0.525	0.319	0.337					
Household size (No) X_4	0.337	0.148	0.098	0.608				
Cost of fertilizer/seeds X_5	0.459	0.286	0.243	0.796	0.535			
Cost of hired labour (Naira) X_6	0.282	0.332	0.116	0.530	0.547	0.537		
Cost of credit (Naira) X_7	0.451	0.346	0.047	0.714	0.596	0.707	0.665	
Credit supply (Naira) X_8	0.350	0.290	0.033	0.577	0.577	0.470	0.493	0.770

Table 4 shows the result of the correlation coefficient of the variables that explain the relationship between credit supply and other farm inputs factors. The table shows that all inputs were positive and weakly correlated to farm revenue (π) except for farm size (X_1) which showed a modest degree of correlation with a coefficient value of 0.525. In principles, the degree of correlation is shown by values ranging between 0 and 1. The nearer the value of the coefficient is to 1, the greater the degree of corre-lation while the closer the value is to 0, the weaker the relationship between the dependent and independent variables. Thus, after farm size (X_1), cost of fertilizers and seeds (X_5) had a correlation coefficient of 0.459, cost of credit (X_7) was 0.451, credit supply (X_8) was 0.350 and household size (X_4) was 0.337. Also, the cost of hired labour (X_6), family labour (X_2) and farming experience (X_1) had the correlation coefficients of 0.282, 0,251 and 0.158, respectively.

The weak relationship between credit supply and revenue may be due to the reason that, credit disbursed to the farmers was inadequate to cover production expenses and had to be supplemented with equity capital or that credit available to the farmers was partly diverted to consumption purposes. Umpton (1997) mentioned that timeliness of loans and ease of securing credit could also influence the productive use of credit. Such untimely, inadequate or misapplied credit could result in a negative effect on farm revenue, income and subsequently inability to pay indebtedness.

Table 5 shows the results of regression analysis for

Table 5. Regression analysis for members of farmers credit group in the study area.

Functional forms	Constant	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	E-value	Errors	R^2
Semi-log	-0922500	-6125	49462	-4769	-2312	5438	8354	173824	31526	13.42	42758	0.8%
	(0.000) ***	(0.824)	(0.055) **	(0.913)	(0.902)	(0.053) **	(0.751)	(0.002) ***	(0.448)			
Double-log	0.361	0.0651	0.189	0.111	0.690	0.203	0.527	0.567	0.255	26.11	0.1547	80.4%
	(0.574)	(0.515)	(0.043)	(0.483) **	(0.318)	(0.046)	(0.581) **	(0.006)	(0.094) ***			

*** Significant at 1%; ** significant at 5%; * significant at 10%. Figures in parenthesis are t-ratios. Here, Double-log had the highest R^2 and lowest standard error. The result of the Double-log function for members of credit groups in the study area: $L_y = 0.361 + 0.651LX_1 + 0.189LX_2 + 0.111LX_3 + 0.0680LX_4 + 0.205LX_5 + 0.0527LX_6 + 0.567LX_7 + 0.255LX_8$
               (0.574)   (0.515)   (0.043)**   (0.483)   (0.318)   (0.046)**   (0.581)   (0.006)**   (0.094)*
The values in parenthesis are t-ratios. $R^2 = 80.4\%$, The standard error = 0.1547, The F-value =26.11, R^2 (adj) = 77.3%.

members of farm credit groups. Based on the criteria for selection, the double-log function was adjusted to give the best fit for the production function analysis. This is because of its low degree of error (0.1547), R^2 of 80% and with 4 explanatory variables that appeared significant.

Hence, from the double-log function, all variables $(X_1 - X_8)$ had positive signs meaning that they were directly related to revenue generated in the farm enterprise. This is in line with the findings of Gyeke (1977) that loans have appositive influence on farm production relationship and that all production parameters were affected by credit. In this regard, expenses on capital input in the form of fertilizer and seeds (X_5) were significant at 5% level. Such modern inputs are important priorities for farmers to increase production which consequently leads to increase revenue, income and disposable surplus which could be used to repay credit from the bank at the end of the season. Therefore, increasing the quantity of fertilizer and seeds (X_5) will increase farm revenue. However, family labour (X_2) was found to be significant at 5% level and this shows the availability and wide use of family labour at the small holder level. Also, cost of credit (X_7) was found significant at 10% level since cost of credit (X_7) relates to the competitive interest rate in the market. The finding confirms the work of Balagon and Ojo (1991) that showed that subsidized interest rate on credit was negatively related to agricultural output, while market rates were positive to output. Ojo and Akanji (1996) mentioned that interest rates represent the price of the capital which reflects its productivity in increasing output. When it is negative it hampers savings mobilization and investment. Finally, credit supply (X_8) was found to be significant at 10% level. This means that increasing the supply of credit will increase farm revenue, income, surplus and better standard of living for the farmers.

Table 6 shows the coefficient of the estimated parameter for the Cobb Douglas production function. The nature of return to scale was ascertained:

Return to scale $= \sum_{k=0}^{n} bl$

From the fitted Cobb Douglas production function thus:

Where, b = coefficient of the variables.

Return to scale for members of farm credit groups

in the area was therefore found to be 0.81. Return to scale from the Cobb Douglas production function shows the percentage change in production; if the input of any of the factors increased by 1% there will be an increase in farm revenue by 0.81% however, at a decreasing rate. In principle, the nature of return to scale is shown by values less than 1 for decreasing return to scale while values greater than 1 means increasing return to scale and values equal to 1 means constant return to scale.

The members of farm credit groups interviewed highlighted several limitations to their involvement in their collection of credit for farming (Table 7). These included inadequate credit for farm production, untimely disbursement of credit, lack of commitment among members of farm credit groups, high cost of farm inputs, high cost of labour and social amenities among others. However, untimely disbursement of credit was ranked first (95%) as a major impediment to the farmers involvement in agricultural production. This was followed by inadequate credit for farm production (78%), high cost of farm inputs (75%), high cost of labour (69%) and social amenities (45%). To a lesser extent was lack of commitment among members of farm credit group (40%).

Table 6. Elasticity of production.

Variables	Coefficient of elasticity
Family labour (X_2) Mondays	0.189
Farm Size (X_3)ha	0.111
Cost of fertilizer and seeds (X_5) (Naira)	0.203
Cost of hired labour (X_6) (Naira)	0.0527
Credit Supply (X_8) (Naira)	0.255
Total	0.810

Table 7. Challenges faced by farm credit groups' members in the study area.

Challenges	(%)
Inadequate credit for farm production	78
Untimely disbursement of credit	95
Lack of commitment among members of farm credit groups	40
High cost of farm inputs	75
High cost of labour	69
Social amenities	45

Source: Field survey, 2007.

Conclusion

On the basis of the result of the analysis, positive and significant relationship exists between agricultural credits and a host of other variables such as farm revenue and the use of input like fertilizer. Therefore, farmers should be assisted to gain access to larger volume of credit so as to increase farm revenue and income as well as their capacity to honour obligations to the banks at the end of the season. Credit repayment may be poor, but farmers under the linkage programme are achieving some benefits which could be improved upon for all parties involved.

RECOMMENDATIONS

1. The practice of encouraging farmers to form viable self-help groups for saving mobilization should continue because farmers are realizing some benefits.
2. Efforts should also be directed towards building their savings capacity and culture.
3. The farmers should improve their poor attitudinal behaviour towards loan repayment.

4. Farmers should take advantage of economic of scale as a group not only in procurement of credit, but also in the purchase of capital inputs.

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