



EFFECTS OF AGRICULTURAL CREDIT FACILITY ON THE AGRICULTURAL PRODUCTION AND RURAL DEVELOPMENT

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Abstract

Lack of capital has been identified as one of the constraints that faced by small scale farmers. The aim of this research was to examine the effect of agricultural credit on the agriculture production, and calculate the inputs and outputs among small scale farmers. Structured questionnaires were distributed to 136 farmers, who had been selected using the stratified random sampling technique, and the data obtained were summarized into percentages. Regression analysis was adopted to assess the impacts of socio-economic factors on loan size among farmers, while Cobb-Douglas Production Function Analysis (CDPFA) was used to test the relationship between key independent variables such as loan amount, farm size, inputs and farm output as dependent variable. The analysis revealed a significantly high value of coefficient of determination ($R^2 = 0.922$) that reflected a high relationship between the dependent variable and the independent variables; gender, age, education, family size, farm size, farming experience. The Adjusted (R^2) coefficient ($R^2 = 0.918$) revealed that 91.8 % of variation in loan size explained by the changes in variables. The results showed a significance in F-test in size of loan. The hypothesis two, exhibited that the independent variables; loan size, farm size, and inputs explained the variation in the total value of farmers output. The study therefore showed that to achieve the positive agricultural credit impacts on agricultural production, The Government and the private sector should regularly and timely facilitate the credit to the small scale farmers.

Key words: Agriculture credit, Agricultural production, Rural development, Small scale farmers

Introduction

In Nigeria today, agriculture accounts pointed that one third is related to the Gross Domestic Product GDP and employs is about two third of the labour force (Oyeyinka, 2002). The Nigerian agricultural policy depends on the small scale farmers in central focus. This is because; the agriculture nations is always dominated by the small scale farmers who represent a substantial proportion of the total population and produce about 90 to 95 percent of the total agricultural output in the country prior to the advent of the oil boom (Ogieve, 2003). Nigeria is well known of her high production in terms of food and cash crops, as well as the supply of most industrial raw materials, which are the products of our small scale farmers. For instance, the total agricultural output between 1986 and 1992 grew up to 0.6 percent per a year on the average (World Bank, 1996). However, this important role of agriculture in economy declined tremendously in Nigeria. This decrement for a long time blamed to the neglecting of the rural sector that comprises mainly the small scale farmers in the country. Because of that food importation increases, thus leads to the depression of the local produced food, which decreased farmers' expected income that could has been used to improve their farm productivity (Okunmadewa, 2003).

Bolarinwa and Oyeyinka (2005) observed that inadequate credit provision and poor marketing systems induced agriculture productivity drastically, to the extent that food importation increased in recent years. According to them, the agriculture in Nigeria and most other developing countries that depend on small scale farmers, several constraints and barriers appeared insurmountable, and limited the farming activity, which reflects heavily on the economy of the country. Food and Agricultural Organization, FAO (2000), reported that rural people need credit facility to allow investment in their farms and small businesses, because lack of credit plagued poor farmers and rural dwellers for many years. So the United Nations (UNRISD, 1975) advocated the granting of micro-credit facility; particularly to the poor rural.

As reported by Olagunju and Adeyemo (2008), the reason of the decline in the contribution of agriculture to the economy is because of the lack of the formal national credit policy and paucity of credit institutions that should assist farmers. Therefore, improvement of the economic condition of the farmers to be self-sufficient and self-reliant in food production is therefore necessary by supporting them, especially in the procurement of inputs.

Although successive governments came up with numerous programs to address the inability of agricultural output to keep pace with the country's demands form the agricultural products, on the other side the credit institutions over the years shy away from lending small-scale farmers, who form the larger part of the population. This is because of high default rates, difficulty in monitoring numerous individuals whose loans and do not provide much return to the investment, as well as ineffective cost (Jumare, 2006). In Nigeria only a few empirical studies have been carried out to quantify the effects of credit in stimulating agricultural output and productivity in order to provide a basis for micro credit advocacy as a strategy for rural development (Amadi *et al* 2001, Omeje and Ajayi, 2009, and Afolabi, 2010).

This study sets out to fill this important information gap by examining the effect of micro-credit on agricultural production using Etinan area as a study case. Therefore this work aimed to: (i) assess the effect of agriculture credit on the socio-economic characteristics of the small scale farmers, (ii) examine the effect of credit on the farm size of the small scale farmers', income, inputs, depending on the volume of output and (iii) identify constraints of small scale farmers in the study area to access to the credit facility.

Hypotheses of the study

- Ho₁: Socio-economic factors of the small scale farmers have not significantly influenced by the level of agricultural credit (loan) used among small farmers.
- .H₁: Socio-economic factors of the small scale farmers have significantly influenced by the level of agricultural credit (loan) used among small farmers.
- Ho₂: Agricultural credits are available to the small-scale farmers and has no significant effect on the farm size, use of inputs and output levels.
- H₂: Agricultural credit made available to the small-scale farmers and has significant effect on the farm size, use of inputs and output levels.

Materials and methods

Research Design

This survey attempted to examine the effect of agricultural credit on agricultural production among farmers in Etinan. In our study, we considered and adopted the descriptive survey design method as more appropriate. The study case included varieties of data and gathering techniques such as personal interaction, questionnaire administration, and review of relevant literature were employed to generate the desired data.

Area of the study

The study was carried out in Etinan Local Government Area of Akwa Ibom State. The area is located between latitudes 4⁰ 30' and 5⁰ 3' N and longitudes 7⁰ 27' and 8⁰ 27' E and attitude 65 m from sea level. The area is divided into two distinct seasons, the wet or rainy and dry seasons. The wet or rainy season begins form April and lasts till October. It is characterized by heavy rainfall of about 2500 – 4000 mm per annum (Edem *et al.*, 2013). The occupations of the people include farming, trading and civil service. About 70% of the residents engaged both in crop farming and animal rearing and on either of these. Hence, it has a total of one hundred and eighty (180) registered cooperative societies across all the communities of which sixteen (16) active and viable agricultural cooperatives are in existence across all communities as at the time of this research.

The study targeted all registered and existing agricultural cooperative societies in the study area which incidentally organize small scale farmers' group. Though, some of the cooperative societies were inactive. Based on this, the focus was on eight (8) active agricultural cooperatives with two hundred and six (206) members (farmers) forming the sampling size.

Sample Size and Sampling

To ensure that all communities were covered, the sixteen (16) active and viable agricultural cooperatives were stratified to four regions, namely; East, North, West and South, each region included two active and viable agricultural cooperative societies, which were randomly selected (Table 1), with a total of eight agricultural cooperatives from all of the regions.

Table 1. Distribution of agricultural cooperatives in the study area

Regions	Name of Agricultural Cooperatives	Male	Female	Total	Sample size
East	Etinan Integration Farmers MPCs Ltd.	15	9	24	16
	Etiuduak Ekem Iman Farmers MPCs Ltd.	18	13	31	20
North	Nung Udo Ikpong (Ikoteb) Farmers MPCs Ltd.	14	18	32	21
	Afaha Iman Farmers MPCs Ltd	11	17	28	18
West	Obio Ette Isong Farmers MPCs Ltd	9	7	16	11
	Nkori Ikot Isong Farmers MPCs Ltd	10	8	18	12
South	Nka Unwan Ikot Obio Eka Farmers MPCs Ltd	14	12	26	17
	Nka Mbohu Unwan (Ekpuk) Farmers MPCs Ltd.	14	17	31	21

To determine the sample size for the purpose of questionnaire distribution; the Taro Yamani formula was used. The formula is stated as follow:

$$n = \frac{N}{1+N(e)^2}$$

- Where: n = sample size
N = population
e = Margin of error (0.05)
1 = Constant

Questionnaire administration and data collection

Both primary and secondary sources of data were utilized in this study. Primary data were collected using structured questionnaires. Questionnaires were administered in conjunction with the field assistants (who usually work with the cooperative office at Etinan Local Government Area). Sample questionnaires were first administered in a trial (pilot test) before the actual survey that lasted for a period of three years (2010 to 2012). The following cardinal issues formed parts of the questionnaire;

- (a) **Characteristics of respondents**, which covered information about i.e. age, sex, educational background, family size and farming experience.
- (b) **Respondents' farming activities**. This focused on size of area under cultivation, and cost and quantity of inputs used. Data were also obtained on crop yield and income generated from it.

- (c) **Finance:** Information was collected on loan volume obtained and disbursed as well as mode of disbursement. Opinion about the constraints of agricultural credit
Secondary data were also obtained to support the study. These include information from journals, articles, and seminar papers as well as text books and printed media.

Relationship between farm credit, farm input, farm output and other socio-economic factors

Fig. 1 clearly shows the relationship between farm credit, farm input, farm output and other socio-economic factors. In model II, socio-economic factors such as gender, age, education, family size, farm size and farming experience of small scale farmers are assumed to have effect on the loan size farmers obtain from financial institutions to enhance their agricultural production. It is expected that any marginal input in term of finance to farmers is most likely to has a substantial effect on the production level (output).

Model 1. shows that the finance (size of loan); fertilizer, pesticide, herbicide, and improved seeds that are given to small scale farmers will also have either a positive or negative effect on the level of agricultural production (output). In view of the above, to evaluate the effect of each of these variables (factors) on the production level of the farmers, it is important to determine the degree of relationship they have.

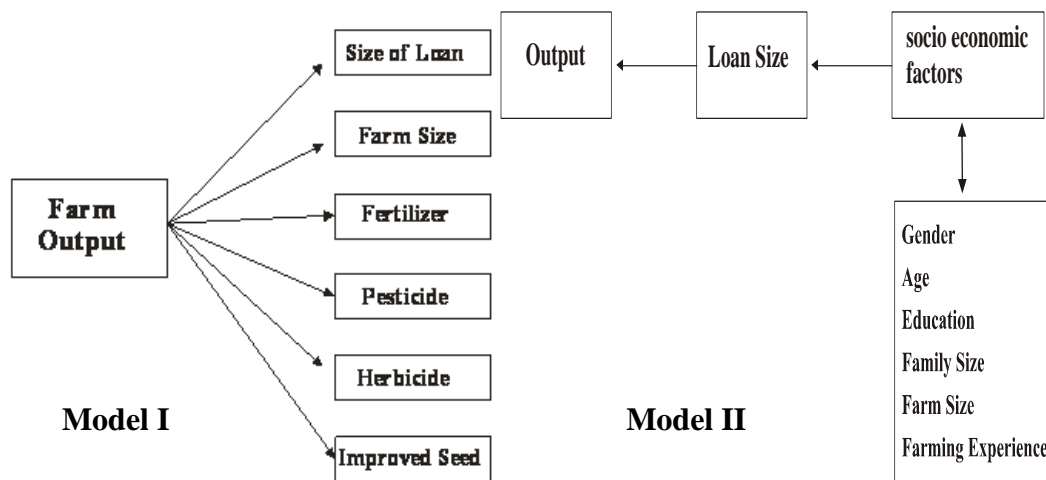


Fig 1. A scheme showing the relationship between farm credit, farm input, farm output and other socio – economic factors.

Validity and reliability of instruments

The measuring instrument used for this study was carefully designed in a way that enables us to elicit opinion, fact and interpretative information pertaining the purpose and objectives of the study after painstaking and constructive critique from colleagues. The data

obtained from the administered structured questionnaires both descriptive and inferential statistics were analyzed and used.

Descriptive Statistics

Frequency distribution tables were used to summarize the information on respondent's age, educational background and family size, farming experience, farm size, and loan size.

Inferential statistics

(i) Linear Regression Model

The linear regression model of the ordinary least square (OLS) approach was used to test the first hypothesis with a view to ascertaining if the age, education, family size, farming experience, and farm size varieties of the small scale farmers have significant effect on the level of credit facility used among farmers. The use of (OLS) was informed by the fact that under normality assumption i.e. the OLS estimator is normally distributed and is said to be best and unbiased linear estimator (Gujarati, 1995).

The model is implicitly specified as follows;

$$Y = f(x_1, x_2, x_3 \dots X_n + e_i) \dots \dots \dots \text{equation (1)}$$

The model is explicitly specified as follows;

$$Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 \dots \dots \beta_k x_k + e_i \dots \dots \dots \text{equation (2)}$$

The double log form of the model is specified thus:

$$\text{Log}Y = \alpha + \beta_1 \log x_1 + \beta_2 \log x_2 + \beta_3 \log x_3 + \beta_4 \log x_4 \dots \dots \beta_k \log x_k + e_i \dots \dots \dots \text{equation (3)}$$

The semi log form of the model is specified thus:

$$Y = \alpha + \beta_1 \log x_1 + \beta_2 \log x_2 + \beta_3 \log x_3 + \beta_4 \log x_4 \dots \dots \beta_k \log x_k + e_i \text{ semi log } \dots \dots \dots \text{equation (4)}$$

Where: α = intercept, Y = Level of Loan (N), $\beta_1 \dots \beta_9$ = Regression coefficients, e_i = Error term designed to capture the effects of unspecified variables in the model, X_1 = Age of farmer (yrs), X_2 = Family size (number of persons), X_3 = Education (categorized), X_4 = Farm Size (ha), X_5 = Farming Experience (No), X_6 = Gender (0 = Male, 1 = Female), α = Constant term

α and β_s are the parameters for estimation and these are the error terms s. The regression analysis was done using SPSS for windows (version 17 Inc. Chicago), and significance was based on an alpha level of 0.05. as it determined the order of importance of the explanatory variables in explaining the variation observed in the dependent variables. T-test was also performed to assess the significance of each of the explanatory variables at the alpha levels of 5%.

(ii) Production Function Analysis

The Cobb-Douglas Production Function Analysis was used to test the second hypothesis in order to estimate the contribution of loan amount, farm size as well as the quantity of inputs on production. According to Tarauni (1996), Cobb-Douglas Production Function it is (i) convenient in interpreting elasticity of production (ii) a method that requires less degrees of

freedom in estimating parameters than other algebraic forms which allow increasing and decreasing returns to scale, and (iii) easy to compute.

The Cobb-Douglas method uses the formula: $Y = a + bx + e$

Where, Y = quantity of output, x = quantity of input, a = constant, b = regression coefficient; e = error term

This is a measure of the percentage change in output that is brought about by a percentage change in input. Hence, the amount of loan was compared with output. This was in consideration of the fact that the research work focused on the effect of credit on the farmers' production levels. The analysis clarified that loan amount, farm sizes and the quantity of inputs (seeds, fertilizer, pesticides, and herbicides) were related to output. The regression model was also used to explain the effectiveness of credit and other factors, which might influence crop output thus;

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + e$$

Where: Y = Output, X₁ = Loan amount (N), X₂ = Farm size (ha), X₃ = Seeds (kg), X₄ = Fertilizer (kg), X₅ = Pesticides (ltr), X₆ = Herbicide (ltr), a = Constant, b = Regression coefficient, e = error term.

Results and discussion

Table (2) showed the socio-economic characteristics of the respondents surveyed on the selected agricultural cooperatives in the study area. The results revealed that 63.3% of the respondents were female, which indicated that female is majorly in farming activities in this area. In terms of age distribution of the farmers, it could be seen that greater proportions (37.5 %) of respondents were between the ages of 36 and 45 years. In general most of the respondents fell within the most economically active age of 35 to 45 years old. The fact that only 6.6 % of the farmers fell within the age range of 25 years old and below, this therefore indicated that youths of this area shifted away from farming as a business. It is noteworthy that about 13.9 percent of the respondents received some forms of formal education. Depending on education qualifications about 63.3 percent of respondents had only primary education or non-formal education at all (Table 2), that is because the area is basically rural.

On the issue of family size, the majority (41.2 %) of respondents had family size ranging from 5 to 9 persons in a household, it was also observed that 45.6 % of the farmers had farm sizes ranging from three to four hectares and 21.3% of the farmers had between five to six hectares of farmland, whereas only 13.2 % had seven hectares of farmland and above. As earlier stated, majority of the rural populace is into small scale subsistence agriculture. Also Table 2 showed the farming experience of respondents. Only 38.3% of the farmers have been in farming between 5 to 9 years, while nearly 84.6 percent farmed for between 5 to 14 years. This could be inferred that, most of the respondents have been in farming business right from since they were adult.

Table 2. Socio-economic characteristics of the respondents

Variables	Frequency (f)	Percentage (%)
Gender		
Male	50	36.7
Female	86	63.3
	136	100
Age Distribution		
15 – 25 years	9	6.6
26 – 35 years	34	25
36 – 45 years	51	37.5
46 – 59 years	34	25
60 and above	8	5.9
	136	100
Educational Qualification		
Primary	49	36.1
Secondary	31	22.8
Post Secondary	19	13.9
No formal education	37	27.2
	136	100
Family Size		
0 – 4	48	35.3
5 – 9	56	41.2
10 – 15	27	19.9
16 and above	5	3.6
	136	100
Farm Size (Hectares)		
1 - 2	27	19.9
3 - 4	62	45.6
5 - 6	29	21.3
7 and above	18	13.2
	136	100
Farming Experience (Years)		
< 5 yrs	21	15.4
5 – 9 yrs	52	38.3
10 -14 yrs	38	27.9
> 14 yrs	25	18.4
	136	100

(Source: Field survey, 2012)

Table 3 showed that farmers obtained credits during the three years under study, 22.8 % borrowed on average between N1,000 to N10,000 per annum. This was followed by 25.7 % of the farmers who borrowed an average of N10,001 to N50,000 per year during the three-years period. And also 27.9, 15.5 and 2.3 % of the farmers each borrowed between N50,001 – N100,000, N100,001 – N200,000 and N200,001 and above, respectively. Only 5.8 % of the farmers declined response to their loan size. Moreover, the majority of the populace were into subsistence farming, with average farm sizes of 3-4 hectares (Table 2) and their income level here was low as most of them cannot have collateral to access large loans.

Table 3. Distribution of the respondents by the loan size

Amount of loan (₦)	Frequency (F)	Percentage (%)
1 – 10,000	31	22.8
10,001 – 50,000	35	25.7
50,001 – 100,000	38	27.9
100,001 – 200,000	21	15.5
200,001 and above	3	2.3
No Response	8	5.8
Total	136	100

(Source: field survey, 2012)

Determining the effect of socio economic factors of the farmers on the level of loan obtained

The analysis in Table 4 revealed that the multiple regression coefficient showed relatively high degree ($R^2=0.922$) of relationship between the dependent variable and the independent variables i.e., gender, age, education, family size, farm size, farming experience. The adjusted coefficient ($R^2 = 0.918$) revealed that 91.8 % of the variation in the size of loan is explained by the changes in variables in the model. Hence, F-test significance showed the joint effect of variables in the model depends on the size of loan. With regards to the effect of individual variables, it was found out that family size, farm size and farming experience were significant determinants of the farmers' size loan obtained at 10 %, 5 % and 1 % conventional level respectively. This however, suggested that a change in these variables could lead to the increase or decrease farmers size of loan they applied for and obtained.

The following variables: gender, education and age were found out to be insignificant. In view of the positive significant relation at 0.05 % of regression estimate of family size, farm size and farming experience as major determinant to the size of loan obtained by the farmers in the study area, we inclined to reject the null hypothesis and accept the alternate hypothesis which stated that socio-economic factors of the small scale farmers have significantly influenced the level of agricultural credit (loan) used among small farmers.

Determination the effect of credit on agricultural production

The production function analysis, the simple and multiple regression analyses were used to determine the extent to which some key factors explained the variability of the output, and the contribution of each of them as independent variables. The analysis was done in two ways:

(i) Loan size was taken as an explanatory (independent) variable, which was related to farm size, quantity of input, and the actual output in separate analysis (simple regression), holding other variables constant and (ii) loan size, farm size, and quantity of inputs were related to output together using the multiple linear regression analysis and the contribution percentage of each input to the output was also discussed.

Table 4. Regression Result for factors that influence level of loan obtained

Item	Coefficient	Standard Error	T-test
(Constant)	-.024	.020	-1.456
Gender	.038	.102	.371
Age	.065	.078	.829
Education	.098	.078	-1.097
Family size	.469	.089	4.255**
Farm Size	.507	.110	6.122*
Farming Experience	-.306	.079	3.878***

Dependent Variable: Loan Size; $R^2 = .922$, $Adj R^2 = .918$, $F = 253.819$,

*, **, *** denote significant differences at 0.05 -0.01 and 0.1 level of probability respectively.

Results of the regression analysis (Table 5) showed that the independent variables taken together explained an average 59.20% of the variation in the output of the farmers. This is a reasonable contribution in which a percent increase in loan amount resulted in increase farm size, fertilizer, seeds, pesticides and herbicides used respectively that led to 28.1, 26.5, 14.8, 6.9 and 50.7 % increase in output.

The F value showed that the effect of all independent variables was significant at 1 percent significance level. Results of the t test indicated that the effect of both loan size and fertilizer were significant ($p < 0.01$) and showed the variate that is most important of the independent variables to explain the variations in output. In view of the positive significant relation at 0.05% of regression estimate in Table 5, we inclined to reject the null hypothesis and accept the alternate hypothesis which states that agricultural credit made available to the small-scale farmers had a significant effect on the farm size, inputs used and output levels in the agricultural production.

Table 5. Multiple linear regression input and output

Item	Coefficient	Standard Error	T-test
Loan amount	.486	0.000	3.847**
Farm Size	.281	2.612	0.994
Fertilizer	.265	0.892	2.889**
Seeds	.148	1.729	1.040
Pesticides	.069	3.356	0.486
Herbicides	.507	4.961	1.685

$R^2 = .592$, $Adj R^2 = .564$, $F = 12.090^{**}$. ** denote significant differences at 0.01 level of probability.

Table 6 showed the distribution of respondents based on constraints to regular accessibility of credit from financial institutions. About 16.9% of the farmers complained of long delay and administrative bureaucracy that affect their interest for accessing loan. Some of the respondents (19.1%) however preferred to borrow money from the financial houses but for some constraints which include lack of credit and high interest rates prevented them from doing so. In the same vein, 34.6 % lacked collateral to access loan. This arises from the facts that their farming activities did not generate enough revenue to enable them to purchase fixed assets that they could use as a kind of collateral to get loan. Therefore, profit earned not enough, especially when an economy of scale is put into consideration, and as such it is assumed that most of it would be swallowed up by the interest charged. It is noteworthy that only 8.8 % of the respondents considered distance to the lending institutions as a constraint. This result is not surprising, considering the fact that there were only two financial institutions, a commercial bank and a community bank in the study area.

Table 6. Distribution of respondents based on constraints to get finance.

Items	Frequency (F)	Percentage (%)
Approval not on time	23	16.9
No collateral	47	34.6
Application procedure complicated	17	12.5
Bank is far	12	8.8
High interest rate	26	19.1
Amount too small	11	8.1
Total	136	100

Conclusion

In general the findings revealed that over the three years pooled, each farmer had larger farm sizes, used more quantity of inputs (seeds, fertilizer, pesticide and herbicide), had higher output from their farms, generated more income, and also had higher cost of production. Agricultural credit enhances productivity and promotes standard of living by breaking vicious cycle of poverty of small scale farmers. Modernizations of agriculture through the use of

improved technologies require some considerable amount of capital investment. Small farmers especially in the developing countries like ours cannot generate enough of this credit from their own savings. This study thus showed that microcredit has the long term potential to boost agricultural production. However, it has to be regular and sustained, while such constraints as the lack of collateral and high interest rates have to be tackled.

Based on these findings, the following recommendations have been proffered;

1. Loan should be disbursed to farmers with minimum delay, since respondents identified timely disbursement of loans as a way of an effective implementation. This, when done on time will enable farmers meet their farm needs in the right season time and increase their farm output.
2. Banks should be widely spread, so that farmers will only travel for a short distance to access financial services, and to utilize the institution credit by the farmers with the view of improving their economic activities.
3. The actual loan size should be given to the applicant (farmers) to enable the farmer to run the project as he planned for. .
4. Stringent application conditions and bureaucratic processes involved in processing application forms should be redressed in order to attract and encourage more farmers and people who may be picking interest in farming thereby solving the problem of unemployment in our economy.
5. An intensive cooperative and credit education should be imparted to those using credit before being entrusted in it. Educational institutions such as the Centre for Rural Development and Cooperatives of the University of Nigeria, Nsukka are relevant here. They should be adequately supported to provide the necessary training to farmers, school leavers and credit managers in the administration of credit and better farming practices.

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