Evaluation of Agricultural Credit Facility in Agricultural Production and Rural Development

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Abstract

Lack of capital has been identified as one of the constraints faced by small scale farmers. The aim of this research work was to examine the effect of agricultural credit on agricultural production among small scale farmers with specific objectives to; (1) determine its effect on farm size and (2) evaluate the quantity of inputs and outputs among small scale farmers. Structured questionnaires were administered 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 the dependent variable. The analysis revealed a significantly high (R^2= 0.922) degree of relationship between the dependent variable and the independent variables; gender, age, education, family size, farm size, farming experience. The Adjusted coefficient (R^2 = 0.918) revealed that 91.8

Index terms— agricultural production, farmers, cob-douglas, loan, rural development, small scale.

1 Introduction

n Nigeria today, agriculture accounts for one third of the Gross Domestic Product GDP and employs about two third of the labour force **??**Oyeyinka, 2002). The Nigeria agricultural policy places the small scale farmers in central focus. This is because; the nations agriculture has always been dominated by the small scale farmers who represent a substantial proportion of the total population and produce about 90-95 percent of the total agricultural output in the country prior to the advent of the oil boom **??**Ogieve, 2003). Nigeria was noted for her high production performance in terms of food and cash crops, as well as the supply of most industrial raw materials, which is the product of our small scale farmers. For instance, the total agricultural output between 1986 and 1992 grew at the rate of 0.6 percent per year on the average (World Bank, 1996). However, this important role agriculture played in the Nigeria economy has declined tremendously, and the decline has for a long time been blamed on the neglect of the rural sector, comprising mainly the small scale farmers by successive administration in the country. As the role of agriculture in the economy decline, food importation increase (Wikipedia 2013), thus leading to the depression of the locally produced food, which has decreased farmers' expected income that could have been used to improve their farm productivity (Okunmadewa, 2003). Bolarinwa and Oyeyinka (2005) observed that inadequate credit provision and poor marketing systems have induced agriculture productivity drastically to the extent that food importation has been on the increase in recent years. According to them, since agriculture in Nigeria and most other developing countries is where small scale farmers predominate, several constraints and barriers which appear insurmountable, limit the overall farming activity which reflects heavily on the economy of the country. The Food and Agricultural Organization, **??**AO (2000), reported that rural people need credit facility to allow investment in their farms and small businesses. This is because lack of credit has

43 plagued poor farmers and rural dwellers for many years. Towards this end, the United Nations (UNRISD, 1975)
44 advocates the granting of micro-credit facility; particularly to the rural poor.

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

49 Although successive governments have come up with numerous programmes to address the inability of
50 agricultural output to keep pace with the country's demand for agricultural products **??**Tribune Newspaper,
51 2009), but credit institutions have over the years shy away from lending to the small-scale farmers (VANGAURD
52 Newspaper, 2010) who form the larger part of the farming population, citing reasons such as high default rates,
53 difficulty in monitoring numerous individuals whose loans do not provide much return on investment, as well as
54 not being cost effective **??**Jumare, 2006). Here in Nigeria only a few empirical studies have been carried out to
55 quantify the effects credit has in stimulating agricultural output and productivity in order to provide a sound
56 basis for a micro credit advocacy as a strategy for rural development (Amadi et al 2001, Omeje and Ajayi, 2009,
57 and Afolabi, 2010).

58 This study sets out to fill this important information gap by examining the effect of micro-credit on agricultural
59 production using Etinan area as a case study. Therefore this work aimed at: (i) assessing the socio-economic
60 characteristics of the small scale farmers and its effect on the use of agricultural credit, (ii) examining the effect of
61 credit on small scale farmers' farm size, income, inputs use and volume of output and (iii) identifying constraints
62 to small scale farmers in the study area with regards to access to credit facility.

2 a) Hypotheses of the Study

64 Ho 1 : Socio-economic factors of the small scale farmers have not significantly influenced the level of agricultural
65 credit (loan) used among small farmers.

66 .H1: Socio-economic factors of the small scale farmers have significantly influenced the level of agricultural
67 credit (loan) used among small farmers.

68 Ho 2 : Agricultural Credit made available to the smallscale farmers has no significant effect on their farm size,
69 use of inputs and output levels.

70 H1: Agricultural Credit made available to the small-scale farmers has significant effect on their farm size, use
71 of inputs and output levels.

3 II.

4 Materials and Methods

5 a) Research Design

75 This survey attempted to examine the effect of agricultural credit on Agricultural Production among farmers in
76 Etinan. Being a fact finding study, we considered and adopted the descriptive survey design method as more
77 appropriate. As a case study, varieties of data gathering techniques such as personal interaction, questionnaire
78 administration, and review of relevant literature were employed to generate the desired data.

6 b) Area of the Study

80 The study was carried out in Etinan Local Government Area of Akwa Ibom State. The area is located between
81 latitudes 400 301 and 50 31N and longitudes 70 271 and 80 271 E and attitude 65m from sea level. The area is
82 divided into two distinct seasons, the wet or rainy and dry seasons. The wet or rainy season begins form April
83 and lasts till October. It is characterized by heavy rainfall of about 2500 -4000 mm per annum **??**Edem et al.,
84 2013). The occupations of the people include farming, trading and civil service. About 70% of the residents are
85 engaged both in crop farming and animal rearing and on either of these. Hence, it has a total of one hundred and
86 eighty (180) registered cooperative societies across all the communities of which sixteen (16) active and viable
87 agricultural cooperatives were in existence across all communities as at the time of this research.

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

7 c) Sample Size and Sampling Procedure

93 To ensure that all communities were covered, the sixteen (16) active and viable agricultural cooperatives were
94 stratified according four regions that makeup the area, namely; East, North, West and South, of which two active
95 and viable agricultural cooperative societies were randomly selected from each region (Table **??**) with a total of
96 eight agricultural cooperatives for all the regions.

8 Table 1 : Distribution of Agricultural Cooperatives in the Study Area.

To determine the sample size for the purpose of questionnaire distribution; the Taro Yamani formula was used. The formular is stated thus: For the purpose of distribution of samples among strata (region), **??**umaisons (1997) 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;N = N 1+N (e)

1. Characteristics of respondents, which covered information on age, sex, educational background, family size and farming experience. 2. 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. 3. Finance: Information was collected on loan volume obtained and disbursed as well as mode of disbursement. Opinion on the Constraints to Agricultural Credit was also solicited.

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.

9 e) 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 socioeconomic 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 size of loan 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 have a substantial effect on their production level (output).

Other than finance (size of loan); fertilizer, pesticide, herbicide, and improved seeds given to small scale farmers will also have either a positive or negative effect on their level of agricultural production (output) as shown in model 1. In view of the above, it is pertinent to evaluate the level of effect; each of these variables (factors) has on the production level of the farmers as well as determines the degree of relationship they have.

10 f) Validity and Reliability of Instruments

The measuring instrument used for this study was carefully designed in a way that enabled us to elicit opinion, fact and interpretative information pertaining to the purpose and objectives of the study after painstaking and constructive critique from colleagues. In analyzing the data obtained from the administered structured questionnaires both descriptive and inferential statistics were used.

11 g) Descriptive Statistics

Here, 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.

12 i. Inferential Statistics a. Linear Regression Model

The linear regression model of the ordinary least square (OLS) approach was used to test Hypothesis one with a view to ascertaining if the Age, Education, Family size, Farming experience, and Farm size variates 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 ??. X n + ei) ???????????.?????????????.equation (1) The model is explicitly specified as follows;Y = ?+? 1 x 1 + ? 2 x 2 + ? 3 x 3 + ? 4 x 4 ??. ? k x k + ei ????..??.?????????.equation (2)

The double log form of the model is specified thus:LogY = ? +? 1 logx 1 + ? 2 logx 2 + ? 3 logx 3 + ? 4 logx 4 ??. ? k logx k + ei ???????.equation (3)

The semi log form of the model is specified thus:Y = ? +? 1 logx 1 + ? 2 logx 2 + ? 3 logx 3 + ? 4 logx 4 ??. ? k logx k + ei semi log ???. equation (4)

Where: ? = intercept, Y = Level of Loan (N), ? 1? 9 =Regression coefficient, ei = 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), ? = Constant term

The ? and ? 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 of 0.05. as it determined the order of importance of the explanatory variables in explaining the variation observed in the dependent variables. The T-test was also performed to assess the significance of each of the explanatory variables at the alpha levels of 5%.

13   b. Production Function Analysis

The Cobb-Douglas Production Function Analysis was used to test hypothesis two in order to estimate the contribution of loan amount, farm size as well as the quantity of inputs in production. According to Tarauni (1996), Cobb-Douglas Production Function 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 Where: $Y =$ Output, $X_1 =$ Loan amount (N), $X_2 =$ Farm size (ha), $X_3 =$ Seeds (kg), $X_4 =$ Fertilizer (kg), $X_5 =$ Pesticides (ltr), $X_6 =$ Herbicide (ltr), $a =$ Constant, $b =$ Regression coefficient, $e =$ error term.

14   III.

15   Results and Discussion

The socio-economic characteristics of the respondents surveyed on the selected agricultural cooperatives in the study area are in Table 2. The results revealed that 63.3% of the respondents were female. This is an indication that female are majorly into farming activities in this area. On 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 of age. The fact that only 6.6% of the farmers fell within the age range of 25 years and below, it 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. The area is basically a rural setting and the above statistics is the level of literacy among the farmers. Hence, about 63.3 percent of respondents had only primary education or non formal education at all (Table 2).

On the issue of family size, majority (41.2%) of respondents had family sizes 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% had between five to six hectares of farmland, whereas only 13.2% had from 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 for between 5 -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 when they were adult. 3 showed that farmers obtained credit 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-year period. And also 27.9, 15.5 and 2.3 % 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, majority of the populace are into subsistence farming, with average farm sizes of 3-4 hectares (Table 2) and their income level here is low as most of them cannot have collateral to access large loans. The analysis of Table 4 revealed that the multiple co-efficient showed relatively high degree ($R^2 = 0.922$) of relationship between the dependent variable and the independent variables; 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, the F-test significance showed the joint effect of variables in the model 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 of loan obtained at 10 %, 5 % and 1 % conventional level respectively. This however, appears to suggest that a change in these variables could lead to the farmers increase or decrease in the 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 0.5 % 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 states that socio-economic factors of the small scale farmers have significantly influenced the level of agricultural credit (loan) used among small farmers.

16   b) Determining the Effect of Credit on Agricultural Production (Production Function Analysis)

In the Production Function Analysis, the simple and multiple regression analyses were used to determine the extent to which some key factors explain the variability of the output, that is, the differential strength of each of them as independent variables. The analysis was done in two ways:

1. Loan amount taken as an explanatory (independent) variable was related to farm size, quantity of input, and the actual output in separate analysis (simple regression), holding other variables constant. 2. Loan amount, farm size, and quantity of inputs were related to output together using the multiple linear regression analysis and the percentage contribution of each input to the output was also discussed. Results of the regression analysis (Table 5) showed that the the independent variables taken together explained on 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 5 percent significance level. Results of the t test indicates that the effect of both loan amount and fertilizer were significant ($p<0.05$) showing 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 has significant effect on their farm size, inputs used and output levels in their agricultural production. $R\,2 =$ .592, Adj $R\,2 =$ .564, $F = 12.090^{**}$, (* Significant at 5% levels). 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 that long delay and administrative bureaucracy often time affect their interest for accessing loan. Some of the respondents (19.1 %) however would have wanted 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 do not generate enough revenue to enable them purchase fixed assets that they could use as collateral for loan. Again, profit earned is 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 % 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 area.

17 Conclusion

In general the findings revealed that for 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 shows 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 framers meet their farm needs in the right season 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, it will go a long way of encouraging the utilization of institutional credit by the farmers with the view of improving their economic activities. 3. The actual amount of loan applied for should be given to the applicant (farmers) so as to enable them embark on project as planned. It is believe that when this is done, the right and improved farming tools will be acquired in time for effectiveness and efficiency in farm production. 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.
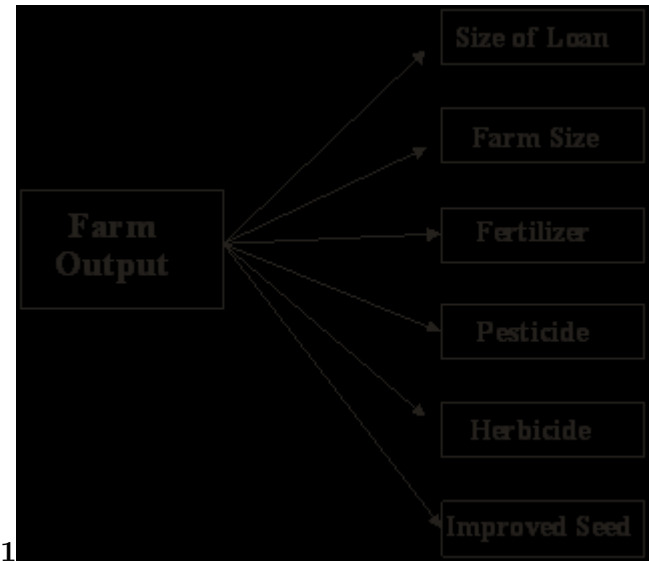
Figure 1:

Figure 2: Figure 1 :

$$
\begin{aligned}
&= \quad \frac{206}{1+206\,(0.05)\,2} \\
&= \quad \frac{206}{1+206(0.0025)} \\
&= \quad \frac{206}{1.515} \\
&= \quad 135.97 \qquad \text{(approx 136)}
\end{aligned}
$$

20

(B)

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

Where:
n = sample size
N = population
e = Margin of error (5% or 0.05)
I = Constant

Substituting values in the above equation:

Figure 3:

2

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	49	36.1
Primary	31	22.8
Secondary	19	13.9
Post Secondary	37	27.2
No formal education	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)		

Figure 4: Table 2 :

Figure 5: Table

3

Amount of loan (N)	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
200,001andabove	3	2.3
No Response	8	5.8
Total	136	100

a) Determining the Effect of Socio Economic Factors of the Farmers on the Level of Loan Obtained

Figure 6: Table 3 :

4

Item	Coefficient	Standard Error	T-Statistics
(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, (* Significant).

Figure 7: Table 4 :

5

Figure 8: Table 5 :

6

Items	Frequency (F)	Percentage (%)
Approval not on time	23	16.9
No collateral	47	34.6

Figure 9: Table 6 :

Item	Coefficient	Standard Error	T Statistics	25
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	
				(B)

Figure 10:

248 supported to provide the necessary training to farmers, school leavers and credit managers in the administration
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