CREDIT ACCESSIBILITY AND PRODUCTIVE EFFICIENCY OF ARABLE CROP FARMERS: EMPIRICAL EVIDENCE FROM EKITI STATE

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ABSTRACT

The study investigated resource use efficiency of yam production by credit using yam farmers in Ekiti State. Data were collected from 78 credit users and 38 non-credit users in the study area with the aid of structured questionnaire. Descriptive statistics, logit regression and production function analysis were used for data analysis. Findings showed that farm size, annual income from yam farming, loan interest rate, cost of labour and associational membership were the determinants of agricultural credit accessibility. Results of resource use efficiency revealed that Credit was over utilized by the credit users while labour was over utilized by both categories of yam farmers. Fertilizer was over utilized by the credit users and underutilized by the non-credit users. The use of production inputs by both category of farmers called for more effective extension services and formulation of relevant policies that would increase credit accessibility to increase yam farmers' productivity in the study area.

INTRODUCTION

Agriculture is the main stay of sub-Sahara African countries where it accounts for 25-40% of total GDP and there has been a steady small increase in its contribution to national economy. For instance in Nigeria it contributed 21.66% in the first quarter of 2018 and 21.91% in the first quarter of 2019. Also it grew by 2.46% in the first quarter of 2018 and 3.17% in the first quarter of 2019 (National Bureau of Statistics, 2019). In addition to food provision to the ever increasing population, it is a source of raw materials to the industries; foreign exchange earnings to the agrarian nations; employment generation to about 70% of Nigerians and income generating industry to many youths. More importantly, the crude oil often describes as the Black Gold which presently constitutes the major source of foreign exchange earnings for Nigeria is- non renewable thus may be exhausted in the future, more also the changes of oil price in the international market and the inward search for alternative sources of energy by the developed world in the future may necessitate no demand for oil which may have a drastic effect on Nigerias economy. This further confirms agriculture industry as the main stay of Nigerian economy.

As important as agriculture is in the developing nations, it is worrisome that the development is at snails speed and the future is seemingly gloomy. This is evidenced by the slow rate of growth of Nigeria's food production. According to CBN (2017) food growth rate has been put at 2.5% while the population growth rate is 3.2% leaving a food deficit of 0.55%. The abysmal performance of the agricultural industry can be attributed majorly to inefficiency of resource utilization (Gani and Omonona, 2009), financial constraints (Liu and Zhuang, 2014) which in turn affects the quantity of inputs purchased and timing of input availability and utilization

As important as agriculture is in the developing nations, it is worrisome that the development is at a snails speed and the future is seemingly gloomy. This is because of poverty characterising the small farmers who constitute the major producers of agricultural output.

Poverty in Nigeria especially among small scale farmers is paradoxical in the sense that Nigeria has what It takes to be rich judging by the available land, water, human and forest resources which have not been translated to wealth. The arable farmers are characterised by strong dependence on rain which is unreliable, crude implements, little or no savings, low level of income, small farm sizes, high labour intensive farm operations and all other characteristics that put them in the abject poverty cycle. To break this cycle of poverty, the capital base of arable crop farmers must be improved through credit accessibility and judicious utilization.

Credit provision and its efficient utilization is fast becoming a major factor limiting farm productivity and income among arable farmers. (Ololade and Olagunju, 2013).Farm credit enables farmers reap economics of scale, venture into new fields of production, expand cultivated land area, employ new technologies and empower farmers to provide utilities for a widening market. It is often seen as any several vehicles used to finance agricultural transactions, including loans, notes, bills of exchange and bankers acceptances.

In realisation of this importance, and to encourage local growers, the Federal Government has developed some programs and projects such as Bank of Agriculture(BOA), Agric. Credit Guarantee Scheme Fund (ACGSF), National Economic Empowerment Development Strategy (NEEDS), Agricultural Credit Support Scheme (ACSS) etc. for financing large agricultural projects such as management of plantations, crop production, ,Investment and fisheries, farm machinery and hired services.

Despite these efforts, arable crop farmers have remained in their abject poverty due to poor credit accessibility, utilization and repayment and inefficient utilization of inputs bought with borrowed funds. Also, even though arable crop farmers are faced with different constraints in the quest to utilize loan accessed and meet food production target, Siyanbola (2012) submitted that credit utilization is a major constraint limiting farmers' agricultural production and economic efficiency.

In Nigeria, farmers face a lot of problems in the acquisition, management and repayment of agric loans. The sustainability and revolving ability of most public agricultural credit schemes have been threatened by high interest rate, difficulty arising mainly from poor management procedures, and low productivity thus leading to a loan diversion and reluctance to repay. (Awoke, 2004). From the foregoing, this study intends to investigate the socio-economic characteristics of credit and non-credit using crop farmers; estimate the factors influencing credit accessibility and determine the productivity of arable crop production among the credit and non-credit users in the study area.

Determining the efficiency status of farmers according to Yusuf and Malomo, (2007) is very important from policy perspective because in an economy where new or improved technologies are lacking, efficiency study will show the possibility of raising productivity by improving efficiency without increasing the resource base.

LITERATURE REVIEW

In any production, the farmer or firm's ultimate goal is profit maximization which the farmer or firm hopes to achieve by the allocation of his disposable resources. It is assumed that a farmer would allocate his disposable resources given an optimal level of production (Haruna, Sanni, Yusuf and Balogun 2008). Efficiency has three components: technical, allocative and economic. Technical efficiency is defined as minimizing input for a given output level or

maximizing output with fixed input. This suggests that there are two approaches to measuring efficiency namely output-oriented and input-oriented. Efficient resource allocation has to do with the extent to which farmers make efficient decisions by using inputs up to the level at which their marginal contribution to production value is equal to the factor prices. This is allocative efficiency (Haruna et al 2008). Economic efficiency combines technical and allocative efficiency. It is on this theoretical underpinnings that this study is based.

Awotide et.al (2008) investigated the relationship between credit access and technical efficiency of maize farmers in Abeokuta North Local Government Area of Ogun State. Data were gathered from 120 maize farmers using multistage sampling technique and analysed using stochastic frontier production function and tobit regression. They found a direct relationship between credit and access to technical efficiency levels. They also found that farm size and labour input were the significant determinants of technical efficiency while age , sex, level of education, farming experience and access to credit were the significant determinants of technical inefficiency of the maize farmers. Haruna et al (2008) assessed the efficiency of resource use in cassava production in Jama,a Local Government Area of Kaduna State using production function analysis on data collected from 120 cassava farmers. The results showed that land,stem cuttings and labour were significant in th production of cassava at 1% level of probability. Land, stem cuttings and fertilizer were underutilized while labour was over utilized by the sampled cassava farmers..

Research Methodology

This study was carried out in Ekiti State, Nigeria. A state that enjoys tropical climate with two distinct seasons: rainy (April – October) and Dry season (November – March). Cassava, Maize, Rice, Yam, Cocoyam are the major arable crops grown.

Sampling Technique and data collection

Multi-stage sampling technique was used in selecting the 120 yam farmers used for this study. Four Local Government Areas were selected randomly in the first stage, two communities where credit users could be identified were purposively selected while in the third stage, 10 credit users were purposively selected from the list obtained from the credit institutions and 5 non-credit users were randomly selected from the communities making a total of 80 credit users and 40 non-credit users respectively. However, only 78 and 38 were accepted for analysis for credit and non-credit users respectively. Data were collected using structured questionnaire administered on the selected 120 arable crop farmers. Collected data were on farmers' socio-economic characteristics, amount of loan accessed, yield/ha, farm size, level of income, revenue from arable crop production, price and other inputs utilized.

Data Analysis

Descriptive statistics such as percentages, frequency tables, mean and mode were used to analyse the socio-economic characteristics.

Model Specification

Logit Regression model was used to determine the factors influencing credit accessibility. Binary choice was specified and estimated using logit regression model because it best fits the non-linear relationship between the probabilities and the explanatory variables. Secondly, the justification for using logit is its simplicity of calculation and its probability lies between 0 and 1 (Ameniya, 1981). Third, its probability approaches zero at a slower rate as the value of explanatory variables get smaller and smaller, and the probability approaches 1 at a slower and slower rate as the value of the explanatory variables gets larger and larger (Gujarati,

1995) Fourth, it has an advantage over Linear Probability Model (LPM) whose values can lie outside the normal 0 – 1 range. The fifth advantage is its extreme flexibility and ease of use from mathematical point of view and results in a meaningful interpretation (Ameniya, 1981 and Gujarati, 1988). All these justify the selection of logit model for this study. The explicit Logit regression model for the study is stated as:

$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9$ …… (1)

Where Y is the dependent variable. It takes 1 for access to credit and 0 without access to credit

X_1 = Age (Years)
X_2 = No of years spent in school
X_3 = Household size
X_4 = Farm Size (ha)
X_6 = Annual Income (#)
X_7 = Loan Interest (%)
X_8 = Farming experience (years)
X_9 = Distance of farmer to loan source (Km)
X_{10} = Cost of labour (#)
X_{11} = Membership of Association (Yes = 1, No = 0)

Marginal Value Productivity

Marginal Value Product (MVP) is the addition to Total Value Product (TVP) by using one or more unit of variable input. In other words, MVP is the value of additional output resulting from the use of an additional input (Osundare and Owoeye, 2018).

In order to evaluate the productive efficiency of arable crop farmers as users of resources, the MVP for each resource will be derived. The MVP of a particular resource will be computed as follows:

$MVP = MPPX_1$ …….PY …… (2)

Depending on the functional form selected as lead equation based on the econometric criteria, the MPP and the corresponding MVP values were obtained as follows:

Linear MPP = $\frac{dy}{dx} = \beta_i$ $MVP = \beta_I$ PY ……. (3)

Semi Log MPP = $\frac{\beta i}{Xi}$ MVP = $\frac{\beta i}{Xi}$PY …….. ….. (4)

Exponential MPP = $\beta_i Y_i$ $MVP = \beta_i Y_i$ PY ……. (5)

Double Log MPP = $\frac{\beta Yi}{Xi}$ MVP = $\frac{\beta Y}{Xi}$PY …….. (6)

Where:

β_i = Regression coefficient to be estimated
Y_i =Mean value of crops (₦)
X_i = Mean value of inputs used to produce the crops
PX_i = Unit price of input X_i
PY = Unit price of Output Y
MFC = Marginal Factor Cost

Resource Use Efficiency (RUE) $\frac{MVP}{MFC} = \frac{MVPXi}{PXi}$ ……(7)

Thus, When RUE = 1, It indicates optimal utilization of resources
RUE = <1, It indicates over utilization of resources
RUE = >1, It indicates underutilization of resources,
RUE = negative value (-) depicts gross inefficiency and over utilization

RESULTS AND DISCUSSIONS

Socio-Economic Characteristics of the Respondents

The socio-economic characteristics of interest to this study are age, annual income, farm size, household size, and farming experience. The maximum age of the farmers was 68 years while the minimum was 23 years. The credit users were slightly older than the non-credit users with a mean age of 42.5 and 39.45 years respectively. The age distribution (Table 1) suggests participation of young people in arable crop farming. All the respondents had formal education. Tertiary education was the modal group for both category of farmers. However, the proportion of those who had primary education and below were more (23.7%) among credit users than the non-credit users (18.4%). Notwithstanding, the educational distribution would favour credit accessibility because of the high literacy level which would favour lending by the formal institutions. Inheritance was the most common method of land acquisition used by the respondents however the proportion of credit users (11.1%) who purchased their land was slightly more than the non-credit users. The mean loan accessed was low (₦180,000) probably due to the inability of farmers to meet lending requirements. This low credit accessibility is disadvantageous to farm investment as loan beneficiaries with high loan size tend to allocate more fund to farm investment than beneficiaries with low loan size (Oboh and Ekpebu, 2010)

Table i: Social –Economic Characteristics of the Respondents

Socio- economics characteristics	**Credit Users**		**Non credit user pool data**			
Age	**Frequency**	**%**	**Frequency**	**%**	**Frequency**	**%**
21-30	10	12.8	15	38.5	25	21.0
31-40	24	30.0	9	23.1	33	27.7
41-50	25	33.8	6	**15.4**	**31**	**27.7**
51-60	9	11.2	5	12.8	14	14.0
61 and above	10	12.5	4	10.3	14	11.8
Total	**78**		**38**		**116**	
Mean Maximum Minimum	**42.52**		**39.45**		**42.48 68 23**	
Educational level						
No formal education	6	7.5	1	2.6	7	5.9
Primary Education	13	16.2	6	15.8	19	16.1
Secondary Education	37	46.2	15	39.5	52	44.1
Tertiary	22	30.0	16	42.1	40	33.9
Total	**78**	**100**	**38**	**100.0**	**118**	**100.0**
Land Acquisition						
Lease	33	40.7	14	35.9	47	39.2
Inheritance	39	48.1	20	53.8	58	50.0
Purchase	9	11.1	4	10.3	13	10.8
Total	**78**	**100.0**	**38**	**100.0**	**116**	**100.0**
Household Size						
Less than 2	12	15.4	15	39.5	27	23.3
3-5	30	38.5	13	38.2	43	43.9
6-9	30	43.6	9	18.4	37	28.0
10 & above	6	10.3	3	7.9	49	4.7
Total	**78**		**38**		**116**	

Arable Crops Grown and Cropping System Used

Results revealed the arable crops grown by the respondents to include maize, yam, cassava, cocoyam, rice. Cassava was the most commonly grown crop by the respondents followed by yam and maize in the second and third positions respectively. With respect to the cropping system used, both sole and mixed cropping system were used for growing the arable crops. Rice was grown solely with maize scatteredly planted in the rice field. A small proportion (10%) of the arable crop growers claimed they grow maize sole while cassava was mostly mixed with maize. The farmers mix cropped to make various food available for consumption and to reduce the risk of crop failure.

Results of Logit Regression Analysis

The results of the determinants of access among arable crop farmers in Ekiti State is presented in Table 2. The explanatory variables listed in the equation were regressed against the amount of loan utilized by the arable crop farmers. The Chi-Square (X^2) of 51.20 indicated by the likelihood estimates of the logit model suggested that the model has a strong explanatory power. All the regressors had positive signs except No. of years. spent in school and household size. The negative sign on these variables suggested that the more of those variables, the less the likelihood of utilizing credit on arable crop production. For instance, the larger the household size, the less the amount of loan utilized on the farm, Large household size though could be advantageous by supplying family labour, but at the same time, it increases the number of mouths fed by the farmers thereby reducing available investible fund. The positive sign on the coefficient of all other variables suggested that an increase in each of these variables would cause the amount of credit utilized for crop production to increase ceteris paribus

Table ii: Determinants of Credit Utilization in Arable Crop Production in Ekiti State.

Variables	Coefficient	Standard Error	Z- Value
Constant	-4..311617	2.613291	-2.26
Age			
No of years spent in school	-0.012563	0.635102	-0.62
Household size	-0.1682168	0.031672	-0.34
Farm Size	1.6118966	0.003147	2.41
Annual Income	0.8911769	0.241163	1.43
Loan Interest	0.6001331	0.126688	1.12
Farming Experience	0.1167216	0.261189	0.16
Distance to loan source	0.3668134	0.266367	0.13
Cost of Labour	0.4168002	0.170022	0.16
Associational Membership (Yes = 1, No = 00)	0.1688220	0.001677	0.20
Gender (Male +/- 1, Female 0)	0.1200018	0.261186	0.42

Source: Field Survey, 2018
No of Observation = 78
Prob, 7 Chi^2 =0.0000
Pseudo R^2 =0.665
Significant @ 5%
LRChi^2 (IZ) = 51.20

Source: Field Survey, 2018

For instance, the larger the farm size, the more inputs required and consequently the more the amount of credit utilized. Similarly, the higher the interest rate, the less the available investible fund. Nevertheless, household size, farm size, annual income, loan interest, cost of labour and associational membership were the significant determinants of the amount of loan utilized for yam crop production in the study area.

Measure of Resource Use Efficiency for Credit Users

The estimates of Cobb-Douglass production were used as the lead equation having met the econometric criteria - such as signs of the coefficient, value of the multiple determination R^2 and significance of the estimated coefficients. The results of the MVPs are presented in Table 3. The MVP of each resource was compared to its Marginal Factor Cost (MFC) to estimate the resource use efficiency in the production of arable crops in the study area. All the resources: farm size, fertilizers, tractor services and amount of credit were all positively signed as shown in table 4. From the table, Marginal value products were compared with the input acquisition price (Px) in order to know how efficient the resources put into production has been utilized. The Resource Use Efficiency (RUE) of the quantity of fertilizers and labour exhibited positive efficiency indices of less than 1 suggesting overutilization of resources. The underutilization of these two resources could be attributed to inadequate fund to purchase enough quantity of fertilizers and employ enough hands to work on the farm. This is corroborated by the fact that credit was also overutilized. Conversely, the efficiency index for credit amount was greater than 1 suggesting over utilization too. Similarly, planting materials were also over utilized.

Table iii: Measure of Resource Use Efficiency of Credit Users

Source	MPP	MVP	MFC	MVP/MFC	Decision
Farm Size	12556.45	10992215	-	-	-
Fertilizers	0.5645	56.7650	78	0.998	Overutilization
Labour Used	3.6650	189	350	0.245	Overutilization
Credit Amount	0.0764	44450	2355	1.56	Underutilization
Quantity of Planting Materials	1.06780	282.021	261	1.31	Underutilization

Source: Field Survey

Table iv: Measure of Resource Use Efficiency of Non-Credit Users

Source	MPP	MVP	MFC	MVP/MFC	Decision
Farm size	6568.49	2354688.67	-	-	-
Fertilizers	1.4564	35.160	96	0.366	Underutilized
Labour Used	61.3456	351	81	4.33	Overutilization
Quantity of planting Materials	1.0654	121	91	1.33	Overutilization

Source: Field Survey

The underutilization of credit as indicated in Table 3 shows that the respondents were not able to access enough fund. Similarly, the underutilization of planting materials may be due to inability to access enough fund and high cost of planting materials. Tale 4 presents the Resource Use Efficiency of non-credit users in Ekiti state. All the resources exhibited positive indices. The ratio of MVP to MFC for fertilizers is suggesting underutilization. This could be attributed to the fact that because the farmers are non-credit users, they were unable to purchase enough quantity of fertilizer required. In the same vein, labour was also over

utilized which may be attributed to availability of family labour judging by the large household sizes and small farm sizes as earlier reported in the article. Planting materials were over utilized probably due to lack of calibrated planting machine thus leading to seed wastage.

Conclusion and policy implications of major findings

In this study, the factors influencing access to agricultural credit utilization and resource use efficiency of credit and non-credit using arable farmers were determined. The study has shown that farm size, annual income of yam farmers, loan interest, cost of labour and associational membership were the determinants of access to agricultural credit utilization. Labour was over utilized among the credit users and non-credit users due probably to the small farm sizes implying unnecessary increase in the cost of production. The underutilization of credit among the credit using farmers is a pointer to the fact that yam farmers may be unable to acquire the adequate quantity of the production inputs. This is corroborated by the fact that planting materials were also underutilized. None of the resources was optimally utilized by both credit and non-credit using farmers. Similarly, fertilizer was also over utilized due probably to inappropriate application methods and small farm sizes. This calls for more effective extension services in Ekiti state. The use of mechanization services to increase cultivated land area will be a step in the right direction.

There is therefore the need for formulation of relevant policies that would break the frontiers to credit accessibility to increase yam farmers' productivity in the state

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