



Farm Profitability and Bank of Agriculture (BOA) Loan Scheme in North Central Nigeria.

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Abstract

This study investigates the impact of profitability and technical efficiency among rice farming households beneficiaries of BOA loan scheme in Benue state. Primary and secondary data were used while methods employed for analyzing data include; descriptive statistics, gross margin analysis and stochastic frontier production model. Results from descriptive statistics shows that a good number of farmers had formal education despite their years of experience and farmers were operating on 1-3 hectares of land due to inadequate loan to fund large scale production. On the average, a rate of return ₦2.14 was made per naira borrowed and invested in rice production in the study area. The study concluded that, access to loan is not a guarantee for higher productivity; hence borrowing (a mark of access to loan) may allow farmers to respond to households needs rather than input market to increase productivity. Based on the findings, farm – specific factors such as education needs to be sustained, this would enable farmers make better technical decision on how to allocate production input effectively.

Keywords: Bank of Agriculture, Technical Efficiency, Productivity, Production.

Introduction

Agricultural credit plays an important role in making farming sector more productive and efficient in developing economies like Nigeria (Ike & Udeh, 2011). As development takes place, one question that arises is the extent to which credit can be offered to farmers to facilitate their taking advantage of the adoption of modern technologies for efficient production (Olagunju, 2007). This is because majority of the farmers lack fund to improve their farm productivity as they are faced with alternatives either to access loan from formal or informal financial institutions. CBN (2010) posited that the formal financial system provides services to only 35% of the economically active population who are mostly farmers while the remaining 65% are excluded from access to financial services. These financially excluded, are often served by the informal sectors finance through Non-Governmental Organization Microfinance Institutions (NGO-MFIs), money lenders, friends, relatives and credit unions. This informal sector finance are unreliable, inadequate in supply and charges higher interest rate. This does not support a vibrant agricultural sector capable of ensuring the supply of food to meet increased demand as well as providing gainful employment for the teeming population.

In order to enhance financial inclusion and at the same time the flow of efficient financial services to farming households, government in the past initiated series of financial credit programmes and policies targeted at small-holder farmers (CBN, 2005). Notable among such programmes and

policies were the Rural Banking Programme (RBP) launched in 1973, Sectoral Allocation of Credit, Concessionary Interest Rate and the Agricultural Credit Guarantee Scheme (ACGS) in 1977. Other institutional arrangements were the establishment of the Nigerian Agricultural and Cooperative Bank (NACB) in 1973, the Nigerian Agricultural Insurance Corporation (NAIC) in 1988, the People's Bank of Nigeria (PBN) in 1989, the Community Banks (CBs) in 1990 and the Family Economic Advancement Programme (FEAP) in 1991. In year 2000, government merged the NACB, FEAP and PBN to form the Nigerian Agricultural Cooperative and Rural Development Bank limited (NACRDB) which was later changed to Bank of Agriculture (BOA) in 2010, to enhance the provision of finance to the agricultural sector. Despite government efforts in increase access to loan by rural farming households, the question is whether these instituted publicly-financing credit programmes and policies achieved the set goals remains an important policy issue.

To cope with the predominant menace, credit use efficiency is a prerequisite for farm production since inefficiency in credit use, can distort food availability and security. For these reasons, the study seeks to ask pertinent questions such as; what are the socio-economic characteristics of rice farming household who are beneficiaries of BOA loan scheme? How profitable are that beneficiaries of BOA loan scheme? Are rice farming households before and after becoming beneficiaries of BOA loan scheme technically efficient? This paper is structured into five sections. After this introduction, literature review presents theoretical foundation for empirical research while the methodological procedures section describes the method employed for analysis. The next section discusses results and the last section concludes and suggests policy recommendations.

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2.1 Empirical Review

The use of the stochastic frontier analysis in the study of agriculture credit in Nigeria is a recent development. Such studies include that of Olagunju (2007) examines the credit-linked differences in production knowledge among sweet potatoes farmers in Osun State. The study sampled 140 farmers comprising 60 and 80 that used credit and those that did not used credit and were randomly selected. Results indicated that farmers that produced with credit use resources efficiently than those without credit. Ike and Udeh (2011) examined the relative allocative efficiencies in input use by credit user and non-credit user small scale poultry farmers in Delta State, Nigeria. Primary data were collected from a random sample of 108 small scale poultry farmers consisting of 54 credit users and 54 non -credit users. The result shows that credit user over utilized labour and under- utilized feed input as well as drugs and veterinary services.

Ayegba and Ikani (2013) observe that unregulated private money lenders are still a major source of financing agricultural sector in Nigeria. The main obstacles for agricultural credit from formal sector include high interest rates, bureaucratic bottlenecks, late approval of loans, and unnecessary request for collateral, among others. They recommend that banks and financial institutions should create credit instruments and services that are tailored to the risks and cash flow patterns in the agricultural sector. The banks should open up new branches in rural areas and avoid unnecessary credit conditionalities that discourage famers from borrowing. Ibrahim and Bauer (2013) have analyzed the impact of micro-credit on rural farmers' profit taking a case of Dryland of Sudan employing the Heckman Selection Model to analyze the responses from 300 samples. The findings from the study affirm the fact that farmers with access to credit are better off compared to those who do not have such access. The study recommends that by increasing the size of the loan, efficient and sustainable technology can be made available to farmers to increase farm profits. Sharma (2014) has analyzed the impact of agricultural credit from commercial bank on GDP growth by using the time series data of Nepalese economy covering the period 2002-2012. This study has found that agricultural credit has positively and significantly impacted agricultural GDP of Nepal. However, use of fertilizer and improved seeds have not shown any significant impact on agricultural GDP. He recommends the extension and deepening of financial service system in the rural area and facilitating the agricultural lending. Rahman, Hussain & Taqi (2014) emphasizes agricultural credit as a major determinant of farm productivity. Their study utilizes logistic regression method on the 300 samples from Bawalpur, Pakistan. With the positive association between credit and agricultural productivity, they conclude that timely provision of appropriate amount of loan to farmers is helpful for the enhancement of agricultural productivity as it enables them to purchase high yielding variety seeds, fertilizers and pesticides.

Ayaz & Hussain (2011) observe that credit availability to farmers is much more important than any other factors to improve the resource use efficiency in agriculture sector. Their study is based on the 300 cross section sample farmers from Faisalabad District of Pakistan. By employing

Stochastic Frontier Production Analysis (SFA), they conclude that credit to agricultural sector has more constructive and significant impact on the farmers' technical efficiency than other factors like farming experience, education, household size and number of cultivation practices. Duy (2012) investigated the impact of agricultural credit on farm productivity taking a sample of 654 farmers from Mekong Delta region of Pakistan by using quintile regression and Stochastic Frontier Analysis (SFA) techniques. The study concludes that technical efficiency and rice yield were positively influenced by access to credit, education level and farm technology. It also demonstrates that access to formal credit sector had a larger effect on rice production than access to informal credit. Akram, Hussain, Sabir & Hussain (2013), observes that access to credit results in a higher level of technical efficiency of farmers. Their study is based on a sample survey of 152 farmers from Sargodha District of Punjab Province of Pakistan. Using stochastic frontier analysis (SFA), the study concludes that agricultural credit in the study area helped the farmers obtain the farm inputs in time, resulting in a higher level of technical efficiency.

Methods & Materials

3.1 Population and Sample Size

The population for the study comprises of rice farming households who are beneficiaries of Bank of Agriculture (BOA) loan scheme. The study is limited to Benue State in North Central Nigeria for the 2016 cropping season. According to Bank of Agriculture headquarter in Benue state (2016), five hundred and ten beneficiaries were rice farming household spread within the three senatorial districts as presented in Table 1.

Table 1: The Study Population

S/No.	Senatorial District	Population Size
1	Zone A	175
2	Zone B	218
3	Zone C	117
Total		510

Source: BOA (2018).

This study adopts the Yard formula propounded by Taro Yamane (1967) to determine the right sample size for this study. The formula states that:

$$n = N/1+N (e)^2$$

Where,

n = the required sample size

N = the population size

e = limit of tolerable sampling error (level of significance).

From the total study population of 510 farmers, the confidence level is set at 95 % and the tolerable error is set at 5 %. Using the equation, the researcher calculates the required sample size for the study as follows:

$$n = ?$$

$$N = 510$$

$$e = 5\% (0.05)$$

$$\text{Therefore, } n = 510/1+510 (0.05)^2$$

$$n = 510/1+510 (0.0025)$$

$$n = 510/1+1.275$$

$$n = 510/2.3$$

$$n = 222.$$

Thus the total sample size for this study is 222 beneficiaries of BOA loans who are rice farming households in the study area. To ensure randomness, the Bourley's 1964 population allocation formula in Nzeribe and Ilogu (1999) was used to determine the individual sample size. The formula is stated as follows:

$nh = nNh/N$ Where,

nh = the sample size per each agricultural zone

n = the total sample size

Nh = the number of rice farming beneficiaries in each zone

N = the population size/total study population.

The required individual sample size per each senatorial zone is calculated proportional as shown in Table 2.

Table 2 Determination of Individual LGAs Sample Size

S/No.	Senatorial Zone/LGA	Nh	nh
1	Zone A: Kwande LGA	175	76
2	Zone B: Guma LGA	218	95
3	Zone C: Agatu LGA	117	51
Total		N= 510	n=222

Source: Field Survey (2018).

3.2 Data Collection

The data for this study were collected mainly from primary sources while three sampling techniques were used. Firstly, multistage sampling method was employed to identify one branch of BOA and a local government area selected in each of the three senatorial Zones, hence, Benue state is clustered into three (3) senatorial zones. Secondly, simple random sampling procedure was employed to select 76 (seventy five) rice farming households who were beneficiaries of BOA in Kwande Local Government Area (LGA) of Zone A while 95 (ninety four) and 51 (fifty) were selected in Guma and Agatu local government area of Zone B and C respectively. In each of the Local Government Area (LGA) selected, four rice producing council wards where BOA loan scheme beneficiaries are prevalence were purposively selected. The council wards in Kwande LGA includes; Menev (19), Mbaikyor (19), Usar (19) and Yaav (19) while council wards in Guma LGA selected were Kaambe (24), Mbabai (23), Nzorov (24) and Uvir (24), whereas the council wards selected in Agatu LGA were Ogbaulu (13), Odugbeho (13), Obagaji (12) and Enungba (13). Structural questionnaire was used to collect cross sectional data from respondents including; input-output data of the rice farming household defined within economies of scale. The output data include yield of rice in kg. The input data include cost of labour, cost of fertilizers, and cost of seed and cost of herbicide. Data were also collected on the socio economic variables such as age, gender, marital status, years of formal education, amount of credit, farm size and the farming experience. The questionnaires were given to educated farmers to fill while uneducated ones were interviewed orally using native research assistants for interpretations.

3.3 Techniques of Analysis

Two techniques were used to analyze the data collected. These are: Firstly, descriptive statistics consisting of simple percentages and proportions was used to examine the socio-economic characteristics of rice farming household who beneficiaries of BOA loan scheme. Secondly, gross margin analysis was also used to compute the profitability of individual rice farming household who are beneficiaries of BOA loan scheme. The purpose of this analysis is to identify the cost, returns and profitability of rice farming household who are beneficiaries of BOA loan scheme. It is given as:

$$GM = TR - TVC.$$

Where

GM = gross margin (₦/ha)

TR = total revenue (₦/ha)

TVC = total variable cost (₦/ha) i.e. the cost incurred in the used of variable inputs. The higher the GM the more likely a farm was considered to be profitable and the smaller the GM, the lesser the profit possibility.

Results and Discussion:

4.1. Socio-economic Characteristics

The respondents’ socio-economic characteristics are summarized in Table 3. The result revealed that average age of the respondents was 54.5 years with majority (54%) aged 60 years and above. This implied that rice farming household in Benue state were dominated by the old men and women who had inadequate energy to tackle the challenges of rice production. Furthermore, most (59%) of the rice farming households in the study area were married and majority were males (51%). This could be that male farmers are more suited to withstand the rigors associated processes of rice production. Most (51%) of the farmers acquired either secondary school education or above. This implies that good number of farmers in the study area had formal education, while majority (53%) had years of experience between 1 and 10 year. These tend to be in line with the findings of Duy (2012), that the rice farmers are educated. Further finding on socio-economic factors showed that majority (53%) of the farmers were small scale subsistence farmers because they were operating on 1-3 hectares of land. The reason could be that lack of adequate credit facilities hinders them to fund large scale production operation.

Table 4 shows the mean difference test result, which indicates a significant difference between the amount of loan requested and amount granted to rice farmers. This implies that the BOA loan tends to meet the demand of their farmers. This could be attributed to the fact that most rice farmers applied for loan below ₦ 200,000 due to lack of collateral security while result on the relationship between amount of loan granted and amount of loan spent on farming showed a significant difference. This could be as a result of farmers spending greater part of loan granted to them on household needs rather than investing on farming.

Table 4: Mean Amount of Loan Requested and Granted to farmers

Variable	Amount	S.D	N	t-Statistic	Prob.	Level of Significance	Decision
Amount requested	215,780	166,884.45	219	1.0360	0.0132	0.05	Reject Ho
Amount granted	199,900	148,958.14		1.8927	0.0180		
<i>Loan Granted and Spent on Rice Farming</i>							
Amount granted	199,900	148,958.14	219	1.8927	0.0180	0.05	Reject Ho
Amount spent on farming	105,201	19,807.05		4.3563	0.0031		

Source: Computed from Field Survey Data, 2018

Table 3: Socio-economic Characteristics of beneficiaries of BOA loan who are Rice Farming Household

Variable	No of Respondents	Percentage	Mean
Gender			
Male	113	51	
Female	109	49	
Total	222	100	
Age (years)			
20- 39	20	9	54.5 years
40- 59	82	37	
≤ 60	120	54	
Total	222	100	
Educational level			
Primary Education	41	18	
Secondary Education	113	51	
Tertiary Education	68	31	
Total	222	100	
Years of experience			
1-10 years	117	53	1-10 years
11-20 years	85	38	
21years and above	18	9	
Total	222	100	
Marital status			
Single	89	40	
Married	133	60	
Total	222	100	
Farm size			
1-3 ha	117	53	1-3 ha
4-6 ha	85	38	
6ha and above	20	9	
Total	222	100	

Source: Computed from Field Survey Data, 2018

4.2 Gross Margin Analysis

Table 5 reveals that the mean total revenue and production costs incurred for rice farming households who are beneficiaries of BOA loan scheme was ₦317,500.00 per hectare and the mean total variable cost was ₦148,691.48 per hectare. The result also revealed a significant difference ($t=8.951$, $p<0.05$) between total revenue (TR) and total variable cost (TVC) as in Table 5. This implies that the mean total revenue is greater than the mean total variable cost which indicates that there is cost efficiency in the use of inputs by the respondents in the study area. The result also showed that the mean gross margin was ₦168,808.52 per hectare and the mean labour cost of ₦82,376.08 was the highest among other costs. This shows that the farmers spent more on labour than other inputs. Furthermore, the maximum gross margin of ₦1638400.00 and minimum gross margin of ₦7600 per hectare implies that some farmers experience positive returns while some experienced negative returns from the mix inputs and outputs got from their farms. There is need for the farmers to be educated on the required inputs needed to obtain optimal gross margin to ensure the sustainability of rice production.

Table 5: Summary Statistics of Gross Margin Earned by Beneficiaries of BOA loan Scheme who are Rice Farming Households in Benue State

<i>Item</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Minimum</i>	<i>Maximum</i>
Total revenue ₦	317500	24312.48	140.0	1875000
Cost of fertilizer ₦	30600	30841.79	0.0	192000
Cost of herbicides ₦	17640	19845.32	0.0	84000
Cost of seeds ₦	5772.18	6842.41	0.0	27600
Cost of labour ₦	83929.30	82376.08	600.0	460000
Transport cost ₦	9950	10127.25	0.0	93800
Sacks ₦	800	674.15	200.0	26000
Total variable cost ₦	148691.48	109635	0.0	575330
Gross margin ₦	168808.52	194628	-7600.0	1638400
Average rate of return ₦	2.14			

Test of Difference of Means of Total Revenue and Total Variable Cost Per Hectares of Rice Obtained by Beneficiaries of BOA loan Scheme

Item	Mean	S.D	Difference	t-Statistic	Prob.	Level of Significance
Total Revenue (₦)	317500	243112.48	168808.52	8.3895	0.0000	0.05
Total variable Cost (₦)	148691.48	109635		3.2939	0.0014	

**T-test significant at 5% level of significance.*

Source: Computed from Field Survey Data, 2018

When the gross margin of ₦168,808.52 was compared with the total variable cost of ₦148691.48 per hectare, the result shows that the two variables were significant farmers, thereby increasing their profit margin. On the output of rice produced by the respondents, the result reveals that the mean output of 2280.0 kilogrammes of rice produced by farming households in the study area with minimum of 34 kilogrammes and a maximum of 16500 kilogrammes. This implies a moderately high output of rice produced by rice farming households in the study area. The result further reveals that 88.0 percent produced over 1000 kilogramme of rice in the study area; this is an indication that rice farming households are profitable, all other things being equal. The average return on gross margin which is the measure of financial success, weakness or failure was ₦2.14 indicating that, on the average a gross margin of ₦2.14 was made per naira credit borrowed and invested in rice production in the study area.

Conclusion and Policy Recommendations

The study concludes that good number of farmers in the area had formal education, despite the number of years of experience acquired, rice farming household were found operating on 1-3 hectares of land due to inadequate credit facilities to fund large scale production. Based on the study findings, farm – specific factors such as education needs to be sustained. As this would enable farmers make better technical decision on how to allocate production input efficiently, especially when targeted at farmers who have had no formal educational opportunities through up scaling. The study also recommends that rice farmers should prudently invest on farm activities, no matter how small their income or loan granted to them may be, so that farmers can obtain adequate inputs as at when due to ensure efficient utilization of farm input. Finally, adequate fund should be provided to BOA for sufficient loan disbursement to farmers; more so, the bank should effectively monitor the beneficiaries activities on the farm to ensure that funds allocated are efficiently utilized.

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