



## **LOAN REPAYMENT AND CREDIT WORTHINESS OF FARMERS UNDER BANK OF AGRICULTURE IN ENUGU STATE OF NIGERIA**

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### **ABSTRACT**

The loan repayment and credit worthiness of farmers under Bank of Agriculture (BOA) in Enugu State were studied. One hundred and twenty respondents were randomly selected for the study using multi stage random sampling technique. The data for the study were collected using a well-structured questionnaire and interview schedule. Multiple regression analysis and logistic analysis were used to address the objectives of the study. The determinant factors to loan repayment in the study area were off -farm income, educational level and membership of organization. In addition, the factors affecting the farmers' credit worthiness were distance from the bank, all-weather road, educational level and off-farm income. The need to ensure farmers' access to educational programme, off- farm income employment and to form or join cooperative society were proffered.

**Keywords:** Loan repayment, Credit worthiness, Farmers, Bank of Agriculture, Logit analysis.

### **INTRODUCTION**

The importance of food lies in being source of energy, maintenance of life and stimulates growth especially when consumed in balanced form. The imbalanced food could lead to decreased energy, constipation and food-related illnesses which could be life threatening in most situations (Food Agriculture Organization (FAO); 2020). In Nigeria, massive food importations, causing billions of Dollars have been embarked for past two decades by successive governments to feed the ever-teeming population. The effect of the imports of such magnitude to other sectors of the economy is causing great concern to government and scholars (Akudugu, 2013). This predicament will continue to rear its ugly head especially when lowly financial reserve of the smallholding farmer, the farming population is put into considerations to engage into innovative farming activities (FAO, 2021) The aforesaid the farming group financial scenario could be related to among others, the poor rural financial market that exists in most countries in sub-Saharan Africa (Agu, and Okoli, 2013). In effect, most of the farmers satisfy their credit needs through engaging in institutional loan source.

The importance of credit to economic development is well documented in literature. Agricultural credit precisely is necessary in order to take advantage of new technologies in order to boost their production frontiers, enhances the welfare of the poor through consumption smoothening that decreases their vulnerability to short-term income and among others (Olomola; and Ade, 2002; Okonkwo – Emegha, 2018, Achoja and Anarah, 2018). However, empirical studies on the loan repayment performances of the farmers have been with great dismay (Agu and Okoli, 2013; Chaudhary, M. A., and Ishfaq, 2003; Ume, Ezeano and Obiekwe, 2018; Okonkwo-Emegha *et al.*, 2018).



The non-repayment of loan in form of both principal amount and interest as asserted by Bernard (2013) could lead to liquidation, shrinking and ineffectiveness, thus constitutes major worry to the bank. Hence, it becomes imperative to identify credit and non- credit worthy farmers before loan could be disbursed to them, in order to curtail maximally the loan repayment problem that has almost crippled the formal lending agency. Specifically, the objectives of the study are to determine the factors that affect loan repayment by farmers from Bank of Agriculture (BOA) and ascertain the credit and non-credit worthy farmers.

## **MATERIALS AND METHODS**

### **The Study Area**

The study was conducted in Enugu State, Nigeria with emphasis on Bank of Agriculture. Enugu State bounded by Ebony State to the East to the West by Abia and Anambra States and to the North by Benue and Kogi States. The State is covered by open grassland with a characteristic feature of the North that includes most of the Udi – Nsukka Plateau that rises to more than 300m. Bank of Agriculture is usually located in the State capital. Thus, in Enugu State, the Bank of Agriculture is located in the State capital which is Enugu.

### **Sampling Procedure and Sample Size**

The list of farmers from Enugu State that benefited from Bank of Agriculture from 2020 -2022 were collected from each of the three agricultural zones (Enugu South, Enugu East and Enugu North). Thereafter, a random sample selection of forty (40) beneficiaries was carried out giving a total of one hundred and twenty beneficiaries that was used for the study.

### **Method of Data Collection**

Primary source of data was used to collect the required information for the study. A well-structured questionnaire was used to elicit and collect information from the sampled farmers.

### **Analytical Techniques**

Multiple regression and logistic model analysis were used to analyze the data. Ordinary Least Square (OLS) of multiple regression analytical technique was used to determine the loan repayment ability by the borrower. The multiple regression models are implicitly stated as:

$$Y = (X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + X_7 + X_8 \dots X_n)$$

Y= Amount of loan Repaid (N),

X<sub>1</sub> = Age of farmers (years),

X<sub>2</sub> = Sex of the farmers (sex, male=1, female=2),

X<sub>3</sub> = Education (Number of years of schooling),

X<sub>4</sub> = Farming Experience (Number of years of farming),

X<sub>5</sub> = Household Size (No),

X<sub>6</sub> = Interest Rate (%), X<sub>7</sub> = Loan period (Years),

X<sub>8</sub> = Farm Size (Ha), X<sub>n</sub> = Error Term

Four functional forms of the multiple regressions were employed in order to select the one that has provided the best fit. The functional forms tried were:

$$\text{Linear function: } Y = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + e_i \quad \dots(1)$$

$$\text{Double log function : } \ln(y) = \ln b_0 + b_1 \ln x_1 + b_2 \ln x_2 + b_3 \ln x_3 + b_4 \ln x_4 + b_5 \ln x_5 + e_i \quad \dots(2)$$

$$\text{Semi log : } Y = \ln b_0 + b_1 \ln x_1 + b_2 \ln x_2 + b_3 \ln x_3 + b_4 \ln x_4 + b_5 \ln x_5 + e_i \quad \dots(3)$$

$$\text{Exponential function: } \ln Y = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + e_i \quad \dots(4)$$

The choice of the best functional form was based on the magnitude of the R<sup>2</sup> value, the high number of significances, size and signs of the regression coefficients as they conform to *a priori* expectation.



Logistic regression model was used to estimate the probability of qualifying for credit worthiness. The model aims to assign the dependent variable to two groups (0;1), such as predicting credit worthiness of clients using iterative procedures (Deni, 2015), it has favour among scholars because of among others with merits of its not assumption of multivariate normality and equal covariance matrices as discriminant analysis, but incorporates non-linear effects, and uses the logistical cumulative function in predicting a default. Statistically, logistics models fit better in explaining the sources of defaults. A common representation of the logistics model in estimating the probability for qualifying for credit worthiness is as follows:

$$P_t(Y_i) = Y_i F(\beta X_{i,t-1}) + (1 - Y_i) [1 - F(\beta X_{i,t-1})] \quad \dots(5)$$

where;

$P_t$  is a vector that includes the explanatory variables of the model (1 is for the model's intercept) and is a vector of logistics coefficients corresponding to the explanatory variables.  $P_t$  takes the value of 1 if firm  $i^{th}$  fails in year  $t$  and 0 otherwise. According to the above model, the probability that a firm with an attribute vector  $X$  being not credit worthy firm is

$$P_t(Y_i=1) = F(\beta X_{i,t-1}) \quad \dots(6)$$

and the probability of the firm being credit worthy firm

$$P_t(Y_i=0) = 1 - F(\beta X_{i,t-1}) \quad \dots(7)$$

where;

$$F(\beta X_{i,t-1}) = \int \beta x_{i,t-1} df(z) = 1 / [1 + \exp(\beta x_{i,t-1})] \quad \dots(8)$$

is the cumulative probability for the logistic probability function. The probabilities are determined by a vector of firm specific variables. The variable is related to the dependent dummy  $i$   $X_{i,t}$  1  $X$  variable positively or negatively depending on the contribution of  $i$ .

The explicit form of the model is:

$$Q = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 + B_6 X_6 + B_7 X_7 + B_8 X_8 + B_9 X_9 + U \quad \dots(9)$$

where;

$Q_i$  = Credit worthiness (worthy; 1; 0, not worthy),

$X_1$  = Gender (Male; 1 and otherwise, 0),  $X_2$  = Age in years,

$X_3$  = Educational Level (In year),  $X_4$  = Farm Size (Ha),

$X_5$  = Membership of Organization (Member; 1 and otherwise, 0),

$X_6$  = Distance to the bank (Dummy),

$X_7$  = All weather road (Dummy),

$X_8$  = Off-farm Income (Dummy),

$X_9$  = Asset – Liability ratio (Dummy) and  $U_i$  = Error Term.

## RESULTS AND DISCUSSION

The socio-economic characteristics influencing farmers' loan repayment ability is shown in Table 1. Based on the statistical and econometric criteria, Cobb Douglas production function was chosen as lead equation. The coefficient of determination ( $R^2$ ) was 0.8643, implying that 86.43% of the variation in the output of the farmers were accounted by various inputs included in the model, while the remaining 8.5% were due to error term. The age of the household head had indirect relationship with to loan repayment of the farmers at 95% confidence interval. This result however is not in consonance with that observed by Aguilera, et al, (2003).

The coefficient of farmers' educational level was significant at 1% level and the sign of the coefficient shows a direct relationship with loan repayment by the farmers. Studies showed that borrowers with training, particularly in agriculture have more likelihood of not defaulting in loan repayment, as the farmer is better equipped to achieve higher outputs and



incomes (Adeyemo, 2007; Oladeed and Oladabo (2008). This however is not in line with the findings of Ume, et al; (2018), who observed that educated individuals particularly in many societies in sub-Saharan Africa often detest farming vocation in preference to white collar' jobs, hence investing in loan in such profession could be counterproductive for proper loan repayment.

Furthermore, the coefficient of off- farm income as expected had direct effect on the probability of loan repayment. This result is in harmony with that of Anozie, et al, (2014) at 90% level of confidence. Off-farm income is a source of liquidity, implying that part-time farmers have high propensity to lower default risk. For instance, salaried borrowers instruct the bank or the lending agency concern to debit such loan from their accounts in installments or full bases as the case may be. This type of arrangement makes the farmers to be credit worthy before lenders, since timely repayment is very much assured, *ceteris paribus*. This is in compliance with Benard *et al.* (2014) who opined that but contradicted the findings of Hananu, Abdul-Hanan and Zakaria (2015) who observed that that farmers with multiple streams of income, perhaps by indulging into off farm activities have higher potential for loan repayment.

**Table 1:** Factors influencing Farmers' Loan Repayment ability

Variable	Linear	Semi-log	+Double log	Exponential
Constants	1.338804 (5.12)***	2.278297 (2.96)***	0.880935(8.02)***	3.046568 (3.02)***
Age	0.0517574 (-1.81)	0.969578(5,15)***	-0.2452487(-2.44)**	0.0072248 (0.200)
Education	0.1147488(2.36)***	-0.2038984 (-0.56)	0.3486909(5.79)***	-0.034186(-4.07)***
Farming experience	0.0663124(0.73)	0.1065837 (0.49)	0.0418603 (0.87)	0.1252106 (0.26)
Household size	0.0223305(2.21)***	-0.0228824(-0.31)	0.0384766 (0.29)	-0.011058(2.09)***
Member of Coop	-0.164546(-2.17)**	-0.020919(-0.13)	0.44404316(2.18)**	0.0237878 (0.49)
Off-farm income	0.1343733 (0.38)	-0.0955739 (-0.37)	0.209577 (1.16)*	-0.005302 (-0.27)
Distance to bank	-0.1739918 (-0.49)	-0.0127944 (-0.51)	-0.1361043 (-0.29)	-0.0110455 (-3.38)
Extension Services	-0.0225933(-0.52)	0.3323274 (0.50)	0.2430999 (2.38)	0.0201258 ( 2.07)**
R <sup>2</sup>	0.5542	0.6397	0.8643***	0.2912
F-Value	8.17***	8.58***	9.08***	5.02***

\*\*\*, \*\* and \* shows 1%, 5% and 10% level of significance respectively. Values in bracket show t-values.

Source: Field Survey, 2021.

Result (Table 1) of coefficient of member of organization was significant at 5% alpha level, implying a direct relationship with loan repayment by the farmers. Farmers that are members of organization such as cooperative society have more likelihood of not being loan defaulters, as they have easy access to information on improved innovations, material inputs of the technology and credit for payment of labour, leading to high output. Ajah, Eyo and Ofem (2014) made similar findings. They posited that cooperative membership farmers through interaction among members enhances their production with a multiplier effect on output.



### Determinant of the Credit Worthiness of the Farmers

Table 2 reveals that the coefficient of age of the household head had direct relationship with credit worthiness at 95% confidence level. Ajah et al; (2014) reported that aged farmers accumulate lots of wealth that could be used as collateral in case the farmer fails to repay the loan. The findings of Oladeed and Oladabo (2008) and Abid, Masmoudi and Zouari-Ghorbel (2016) were not in support of the aforesaid statement. They posited that youths are usually able-bodied and innovative individuals to enhance their farm output to pay back the interest and principal of the loan.

The result of the coefficient of distance from the bank to the borrower as indicated in Table 2 was found to be positive. This is in line with the *a priori* expectation. The result was significant at 1% level of significance. This implies that farmers who live in places close to the lending agency (bank), have more likelihood to be credit worthy than those far away, because of ease of supervision by bank staff of farmers' farms. Da-Grift and Addo (2011) made similar finding.

Also, the coefficient of all-weather roads was positive and significant at 5%alpha level. The all-weather road allows for ease of access to information, infrastructures and extension services, hence predisposing such farmers to high farm productivity and credit worthiness (Ume, et al; 2018). The findings of Okonkwo - Emegha (2018) concurred to the above assertion.

The coefficient of off-farm income was positive and significant at 1.0% risk level. This result is in consonance with the findings of Ajah *et al.* (2014). Off farm income facilitates to preclude the seasonality of primary agricultural production, ensure multi-stream of income to cater for family welfare, consumption smoothing and risk insurance mechanism, hence thwarting the propensity of diverting agricultural credit to none farm uses (Ume, et al; 2018). This finding accords with Hananu *et al.* (2015) in their study. The authors posited that low-risk loan applicants have more off-farm income which increases ability to service debt and on time.

**Table 2:** Determinant of the Credit Worthiness of the Farmers

Variables tested	Coefficient	z-value	p-value
Constant	10.00309	2.82	0.005***
Farm size	0.3366882	1.93	0.026
Distance from bank	0.8068959	2.59	0.010***
All weather road	0.2693016	1.16	0.244**
Assets and liability	0.8454344	2.91	0.004
Education	0.7750969	2.62	0.009***
Off-farm income	0.0439408	1.96	0.029**
Extension contact	0.7265309	2.43	0.015

Pseudo  $R^2 = 0.4970$  Prob > Chi = 0.0000 LR Chi (9) = 75.21; \*\*\*, \*\* and \* shows significant at 1%, 5% and 10% level of probability, respectively.

Source: Field Survey, 2021

### CONCLUSION AND RECOMMENDATIONS

Based on the findings the following conclusions were deduced;  
The determinant factors to loan repayment in the study area were off -farm income, educational level and off-farm income. The result also showed that the factors affecting the farmers' credit worthiness were distance from the bank, all-weather road, educational level and off-farm income. Based on the findings, the following recommendations were proffered:





1. For easy of loan monitoring and evaluation by bank staff, farmers that have their farms close to the bank should be considered in loan administration more than those far away.
2. Farmers with high level of education should be considered for loan approval, since level of education is positively related to credit worthiness. The farmers' educational status could be achieved through adult education, seminars and workshops.
3. Banks should give more preferential treatment to relatively aged farmers in loan approval, since they had positive relationship to loan repayment and credit worthiness.
4. The need to improve the infrastructures of the rural areas by government and non-governmental Organization in order that farmers could earn extra income from their farm income through engaging in off- farm income. The fund generated could serve as a panacea in loan servicing.
5. Farmers should be encouraged to form or join cooperative to ensure effective loan repayment through effective loan administration, monitoring and recovery.

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