

Determinants of rural bank loan repayment capacity among farmers in Yewa Division of Ogun State, Nigeria

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Abstract

This study examined the determinants of the Nigeria Agricultural Cooperative and Rural Development Bank (NACRDB) repayment by farmers in Yewa division of Ogun State. Primary data collected through scheduled interview with the help of a structured questionnaire as well as secondary data were used for this purpose. Descriptive analytical tools, linear discriminate function, and multiple regression analysis were used to analyze the data collected. Results show that majority of the respondents attributed reasons for loan default to production failure due to weather, pests, diseases and poor storage (72.5%). Furthermore, a good proportion of loan defaulters (52.5%) use the loan for farming. Discriminate analysis conducted shows that the total annual income of the household heads, other occupation of the respondents and membership of cooperative society are the most significant variables that discriminate between rural bank users and non-users. The regression analysis shows that the most important variable for loan repayment is farm size (hectares) accounting for 32% of the variations in repayment level of the credit user, followed by farm income(0.29%). It was suggested that NACRDB loans should be disbursed through farmers' cooperative society, with adequate monitoring and supervision.

Keywords: Loan acquisition, Loan repayment, Discriminant function, Agricultural bank

Introduction

Lack of financial capital is one of the major constraints of agricultural development in Nigeria. In the early 70s, just before the establishment of rural banking scheme, Nigeria Agricultural and Cooperative Bank, and Community Bank, majority of the commercial banking activities were largely performed in the urban areas where it is targeted on the rich. Many previous studies showed that the

larger portion of Nigeria population was farmers, lived in the rural areas and in abject poverty (Akinbode 1995, Okuneye, 2002; Elumilade, Asaolu and Adereti, 2006). Most of the rural savings were kept with the registered Thrift and Credit Cooperative Societies, which in turn made deposit with the commercial bank in towns and cities (Olaitan, 2006).

The process of operating account with the banks located in urban areas was a

tedious process for both the cooperative society and the individual members of the rural communities. The problems of bank users from rural areas as indicated by previous studies include: distance covered, difficulty of securing transportation and the fear of losing money to thieves and armed robbers while going to or coming from the banks located in urban areas (Anyanwu 1995, Williams 1998, Enoma, 2010, Olagunju F.I, and A. Ajiboye, 2010). As a result of the low patronage of farmers to commercial bank, and inability of commercial bank to concentrate their efforts in the rural sector, the Federal Government established Nigeria Agricultural and Cooperative Bank (NACB) in November 24, 1973, but now known as Nigeria Agricultural Cooperative and Rural Development Bank (NACRDB).

The Nigeria Agricultural Cooperative and Rural Development Bank (NACRDB) is an apex rural development financial institution set up to extend credit to agriculture and agro-allied sectors of the Nigerian economy. This is carried out through the provision of loans to farmers and cooperative societies. In addition, the bank provides financing by direct investment in equity capital of major agricultural and agro-allied industries ventures (Bamire and Oludimu, 2001). The sole activities of the bank are directed at assisting rural development and mobilizing rural savings behaviour, thus, improving the income and general welfare of farmers.

In Nigeria, one of the barriers to the development of agriculture is the poor funding of farmers. The government has provided credit at little or no interest to farmers through NACRDB, but the problems that led to this credit policy and the establishment of NACRDB still persists (Ayanda and Ogunsekan, 2012). The

majority of Nigerian farmers continue in their traditional way of farming due to their inability to afford modern technology. Consequently, they still produce at low level of output. It is therefore, pertinent to verify the functionality of the rural credit institutions, NACRDB and the involvement of farmers in banking activities. The questions that keep roaming one's mind, therefore, are:

1. Does the farmer aware of the rural bank facilities?
2. Is the credit properly monitored to ensure that loans obtained are not diverted?
3. What factors determine the use of rural bank loan facilities?
4. What are the socio-economic characteristics of the farmer that encourage repayment of loan?

If NACRDB is to achieve its set objectives, answer to these questions must be provided.

This study, therefore, aims at determining the extent to which the socio-economic factors affect rural bank credit acquisition, utilization and repayment of such credit among farmers. Specifically, the study identify reasons for non-use of rural bank credit facilities; examine the use to which farmers put their credit and its effect and repayment of such credit; examine the socio-economic characteristics of farmers that influence their participation in rural banking; and examine the relationship between the socio-economic characteristics of the farmers and credit repayment level.

Methodology

The data were collected from a survey of farmers in Yewa Division of Ogun State which is made up of five Local Government Areas, (LGA) namely: Yewa North, Yewa South, Ipokia, Ado-Odo/Ota and Imeko-

Afon LGA using simple random sampling. A case of the Nigeria Agricultural Cooperative and Rural Development Bank (NACRDB) was used in the study to represent rural banks. This was so because NACRDB offices spread across all the Local Government Areas of the State; in particular the study area.

Samples of five villages were randomly taken from each of the five Local Government Areas in the study area. In each village a random sample of 5 respondents were interviewed. A total of 125 respondents, users and non users of credit facilities, farmers were sampled. Only 75 out of 125 respondents sampled were NACRDB users while the remaining 50 were non-users. Information were collected, using structured questionnaires, on their socio-economic profile, sources of credit, demand for credit, and their repayment of credit. Secondary data obtained from NACRDB were also used.

Data collected were analyzed using both descriptive statistics and quantitative analysis. Descriptive statistics was used to describe reasons for non-use of rural bank credit facilities and the use to which farmers put their credit and its effect on repayment of such credit.

To distinguish between the bank users and non-users, nine variables were chosen, and used to measure the respondents' socio-economic and cultural characteristics. The variables were: (X_1) years of formal education; (X_2) gender; (X_3) awareness of the existence of the rural bank; (X_4) total annual income of household heads; (X_5) age in years; (X_6) occupation of respondent; (X_7) household size; (X_8) membership of a cooperative society; and (X_9) distance of residence from the rural bank in kilometres.

The binary grouping variable was the use or otherwise of rural bank (NACRDB) facilities. Thus, a linear discriminate function was estimated, following Okorie, 1992; Arene, 1993; Awoyemi and Olowa, 2010; Njoku and Inanga, 2012; and Ojiako and Ogbukwa, 2012.

$$D = \beta_1 Z_1 + \beta_2 Z_2 + \beta_3 Z_3 + \beta_4 Z_4 + \beta_5 Z_5 + \beta_6 Z_6 + \beta_7 Z_7 + \beta_8 Z_8 + \beta_9 Z_9$$

Where D is total discriminate scores; β 's are weighting coefficients; and Z's are standardized forms of the discriminate variable, X's.

The concept of discriminant analysis: The method of discriminant analysis seeks to discriminate between two or more populations on the basis of multivariate measurements made on samples drawn from these populations. If we draw a sample from each of two known populations and we make measurement of some identified variable that describe the characteristics of the member of each population, we can use the information thus collected to set up a rule, which can be used to allocated a new member to the correct population, even when we do not know a priori, from which population it emanates.

Let X_{ij} ($i = 1, 2, \dots, N$ and $j = 1, 2, \dots, M$) be set of M random variables from a normally distributed multivariate population. If we split the N observations in the sample into two classes with sizes N_1 and N_2 , respectively and with $N_1 + N_2 = N$, we obtained the mean values X_{1j} and X_{2j} for each variable j in the two samples and compute the differences between these means as:

$$d_j = X_{1j} - X_{2j} \quad (1)$$

To find a linear function:

$$Z = \beta_1 X_{1-} + \beta_2 X_2 + \beta_3 X_3 \dots \dots \beta_m X_m \quad (2)$$

which best discriminate between tile two classes.

Where:

Z = Total discriminant score

X_m = The observation on jth variables

β_m = Is the weight assigned jth variable as a

measure of its contribution to the Z score

And if we represent the differences between the means Z1 and Z for the two classes by D, we have

$$D = \beta_1 X_{1-} + \beta_2 X_2 + \beta_3 X_3 \dots \dots \beta_m X_m \quad (3)$$

The variance of Z is proportional to:

$$V = \sum_{j=1}^m \sum_{k=1}^m \beta_j \beta_k S_{jk} \quad (4)$$

$$S_{jk} = \sum_{i=1}^n (X_{ij} - X_i)(X_{ji} - X_k)$$

And are elements of a dispersion matrix formed from X_{ij} and X_{ik}. If we assume homogeneity of variance, the function that best discriminate between the two classes is given in matrix form as follows:

$$S\beta = d \text{ or } \beta = S^{-1}d \quad i.e$$

$$\begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_m \end{bmatrix} = \begin{bmatrix} S_{11} & S_{12} & \dots & S_{1n} \\ S_{21} & S_{22} & \dots & S_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ S_{m1} & S_{m2} & \dots & S_{mn} \end{bmatrix} \begin{bmatrix} d_1 \\ d_2 \\ \vdots \\ d_m \end{bmatrix} \quad (6)$$

This provides the required solution for λ_{ij} in the discriminant function. These co-efficient are according to Tintner proportional to the coefficient to the linear function, which in the population, discriminate best between the two classes in the particular sense indicated above.

A statistical test of significance of the discriminant function requires the computation of a co-efficient:

$$e = \frac{N_1 N_2}{N} \sum_j \beta_j d_j \quad (7)$$

The variance ratio with M and N-M-1 degrees of freedom:

$$F = \frac{(N - m - 1)e}{M(1 - e)} \quad (8)$$

Subsequently, after solving for m, Z scores for good customer (Z_G) and for bad customer (Z_B) can be estimated from:

$$Z_G = \beta_1 X_{1G} + \beta_2 X_{2G} + \dots \beta_m X_{mG} \quad (9)$$

$$Z_B = \beta_1 X_{1B} + \beta_2 X_{2B} + \dots \beta_m X_{mB} \quad (10)$$

Cut of point: The cut-off is usually taken as the mid-point of Z_G and Z_B = ½ (Z_G + Z_B) because discriminant function analysis itself assumes equal cost of misclassification, (Awoyemi and Olowa, 2010).

The multiple regression analysis was employed to examine the relationship between the socio-economic characteristics of the farmers and credit repayment level. The model is specified, as:

$$Y = f(X_1, X_2, X_3, \dots \dots \dots X_g, u)$$

Where (Y) amount repaid in naira; (X₁) Borrower's age in years; (X₂) Size of credit in naira;

(X₃) Educational level of credit beneficiaries in number of years spent at school; (X₄) Farm size in hectares; (X₅) Farm size in number of livestock; (X₆) Household size in number of persons; (X₇) Cost of obtaining credit measured in terms of amount spent on

transportation, social gratification and interest charged by NACRDB; (X_8) Annual net farm income in naira and (U) Error term.

Results and Discussion

Reasons for Non-Acquisition of Rural Bank Credit

Farmers' attitudes to use of rural bank credit differ. Some farmers do not use credits either because they are unavailable or because of credit acquisition constraints, while others have no need for credits. Table 1, presents the major reasons given by the farmers for non-acquisition of agricultural credit.

Table I: Distribution of NACRDB loan non-beneficiaries by their reasons

S/N	Reasons	No of Non-Beneficiaries	Percentage of Respondents
1.	Difficulties and protocols involved in obtaining loans	31	62
2.	High interest rate charged by Bank	12	24
3.	Lenders harsh measures of recovering loans	5	10
4.	Have no need for loan	2	4
	Total	50	100

Source: Computed from field survey data, 2013

Results from Table 1 show that majority (62%) of the non-credit beneficiaries could not use loan because of the difficulties and protocols involved in loan acquisition, while 24% were discouraged by high interest rate charged by rural banks. Only 4% of the sampled farmers have no need of loan while none of the farmers claimed non-availability of credit facilities. For the non-credit users, it is not surprising that difficulties and protocols involved in getting loans ranked first because the applicants were faced with bureaucratic processes such as provision of guarantors, passports and completion of complex forms. An illiterate farmer may not want to expose his or her identity as a debtor by looking for a guarantor or somebody to complete the complex forms. Also, the

measures taken by lenders to recover loans from defaulters may discourage the applicants. In similar studies, It was reported that rural bank set up arbitration panel/task force to recover loans from defaulters (Afolabi, 2010, Ayanda and Ogunsekan, 2012). These measures may appear very humiliating and terrifying to prospective borrowers.

Credit Utilization by Beneficiaries and its Effect on Repayment

People borrow money for different reasons. The purpose and reasons for which a loan is obtained, however, may affect its utilization and, consequently repayment. The response of 40 loan defaulters and 35 non-defaulters farmers on how they utilized their last loan obtained are shown in Table 2.

Table 2: Distribution of loan beneficiaries by credit usage

S/NO	Use of loan obtain	Loan Defaulters		Non-Defaulters	%
			%		
1	Farming only	21	52.5	35	100
2.	Solve family problem and farming	14	35	0	0
3.	Doing other business and farming	5	12.5	0	0
4.	Doing other business and not farming	0	0	0	0
Total		40	100	35	100

Source: Computed from field survey data, 2013.

It is worthy of note that a large proportion of the loan defaulter (52.5%) used the loan obtained for farming; This result implies that their inability to pay was an evidence of inefficiency of fund application on their farms or mismanagement of farm profit. All non defaulters (100%) used their loan for farming. The result portrays the two most characteristics of small-holder farmers in loan utilization in Nigeria, namely diversion and diversification. Diversion of loans stems mostly from the time lag in agricultural returns, the myriad of socio-economic problems requiring immediate solutions which the farmers are saddled with, and the untimely disbursement of loans to farmers. It is, therefore, common for farmers to divert agricultural loans to solving family problems. On the other hand, diversification

of loans by farmers is caused by the need to have regular sources of income to meet urgent socio-economic need, thereby, farmers spend loan on other businesses as well as farming.

Reasons for Loan Default

A number of reasons have been identified for farmers' inability to repay loans. These include unsuitable technology; lack of adequate market outlets; unsuitable and inflexible repayment arrangements; lack of supervision; natural disasters and regarding of loans as one's share of the 'national cake' (FAO, 2012); the reasons given by 40 loan defaulters of the NACRDB for zero or partial repayment are shown in Table 3.

Table 3: Distribution of defaulters by reasons for zero / partial repayment of loan

S/N O	Reason	Frequency	Percentage of Respondents
1	Production failure due to weather, pest, disease and poor storage	29	72.5
2.	Financial problem in the family	9	22.5
3.	Poor marketing resulting from low price	2	5
Total		40	100

Source: Computed from field survey data, 2013.

This study reveals that 40 out of 75 rural loan beneficiaries sampled defaulted. Majority of the loan defaulters (72.5%) blame their default on production failure while about 23% blame their default on financial problems in the family and only 5% attributed it to poor marketing resulting from low price.

Effect of Socio-economic Characteristics of Farmers on their Participation in Rural Banking

Discriminant analysis was performed on the data collected from the sample rural residents. The step-wise procedure was used to select the best discriminating variable (Table 4).

Table 4: Estimated Canonical and Correlation Coefficient Gap

Discriminate Variable	Canonical coefficient	Correlation coefficient
Z ₁	0.754	0.466
Z ₂	0.849	0.159
Z ₃	- 0.815	- 0.425
Z ₄	- 0.696	- 0.240

Source: Computed from field survey data, 2013

The four variables namely, awareness of existence of the rural bank (X₃), total annual income of household head (X₄), other occupation of the respondent (X₆) and membership of cooperative society (X₈) were statistically significant at five percent level. Three variables - education level in years, membership of social club and household size were not eliminated by the step-wise procedure but they did not contribute significantly as discriminating variables. The final three variables - sex, age and position held in the community - were dropped during the step-wise procedure because their values were too low.

Thus, the canonical discriminate

function obtained.

$$D = 0.754 Z_1 + 0.849 Z_2 - 0.815 Z_3 - 0.696 Z_4$$

Where Z₁ the standardize value existence of rural bank Z₂ the standardize value of total annual incomes of household head; Z₃ the standardize value of other occupation of the respondent and Z₄ the standardize value of membership of cooperative society.

Table 5 shows that both the canonical correlation associated with the discriminate functions and the Wilk's Lambda criterion confirmed that the variables identified by the step-wise procedure were significant discriminating variables.

Table 5: Co-efficient of discriminant and Levels of Significance

Variable name	Wilk's Lambda	Significance
X ₁ Education level in year	0.831	0.507
X ₂ Gender (sex)	0.848	0.764
X ₃ Awareness of the existence of the rural bank	0.979*	0.002
X ₄ Total annual income of household head	0.819*	0.000
X ₅ Age in Years	0.854	0.577
X ₆ Other occupation	0.836*	0.000
X ₇ Household Size	0.856	0.577
X ₈ Membership of Cooperative Society	0.856*	0.000
X ₉ Distance from residence to rural bank	0.852	0.769

*Source: Computed from field survey data, 2013., *P < 0.05*

The results in Table 5 shows the critical policy variable in the design of a rural bank policy. These variables distinguish rural bank users from non-users. Discriminant analysis showed that total annual income of household head, other occupation of respondent and membership of cooperative society as the most important variables separating rural bank users and non-users.

It is important to note that the role of income and awareness of rural bank, in determining saving behaviours of the rural people are complimentary. To a large extent, income determines how much is to be saved while rural bank, awareness influences where the money is to be saved. Evidence from this study showed that a rural farmer who is fully informed about rural banking would prefer to save with a bank.

Effect of Socio-economic Characteristic of the Farmers on their Credit Repayment Level

Empirical evidence was obtained by means of multiple regression analysis to determine the factors that affect the repayment level of credit beneficiaries in the study area. Data from Seventy-five credit beneficiaries were used for the multiple regression analysis. The functional form could not be determined a priori, consequently, different functional forms linear, semi-log and double-log functions were tested. The linear function was chosen as the lead equation, as it had the highest R² and gave reasonable fit. About 63%, of the variability in credit repayment was explained by the explanatory variables. The farm size in hectares (X₄) and coefficient of annual net farm income (X₈) were significant at 5% level respectively.

Table 6. Estimated Regression Coefficient and T-value

Variable Code	Variable name	Regression Coefficient	T-Value
X ₁	Size of credit in Naira	2.305	-1.174
X ₂	Borrower's age in years	4.894	0.940
X ₃	Educational level	11.188	1.000
X ₄	Farm size in hectares	32.106*	2.064
X ₅	- Farm size in no livestock	7.450	1.212
X ₆	House hold size	18.840	1.636
X ₇	Cost of obtaining loan	0.196	0.159
X ₈	Annual net farm income	0.296*	2.970

Source: Computed from field survey data, 2013. * $P < 0.05$

Farm size in hectares was the most important variable accounted for about 32% of the variation in repayment by loan beneficiaries, next to it is the farm income, accounted for about 0.30%. The positive and significant regression coefficient indicates that high level of farm income and the farm size (in hectares) of the beneficiaries were directly related to their repayment level. Thus, the higher the income received by the beneficiaries from the farm or the larger the farm size cultivated, the greater the ability to repay loan. A larger amount of income, *ceteris paribus*, increases their ability to save and their purchasing power of production resources, leading to increase in production and further income and thus increasing ability of credit repayment.

Conclusions and Recommendations

Adequate financing has great potentials of improving agricultural production in Nigeria but the high risk and uncertainties involved coupled with a lot of non-repayment of loans by beneficiaries; problems faced in acquisition of loan and diversion of loan due to lack of adequate supervision by the NACRDB officials have limited the level of participation in rural

banking activities and hence affected the loan disbursement trend by the NACRDB.

Furthermore, from this study it could be concluded that income generation by the farmers was very paramount; and most of the farmers would want to combine other occupations with farming and even join cooperative societies to acquire more loans for their farming activities. Then, from the study, it could be concluded that as the farm size increases the income generated increases and their willingness to participate in rural banking increases. Rural banking participation by farmers could be improved if loan could be provided promptly and adequate supervision is made by NACRDB. Based on the foregoing, the following recommendations were made:

- i. Adequate loans should be promptly approved by NACRDB for viable agricultural project, this will enable farmers expand the farm size, generate substantial income and improve their saving ability.
- ii. Farmers should be encouraged to participate in cooperative societies. This has been noticed - in the findings of the study to be a good catalyst for loan repayment.

- iii. Proper monitoring, supervision of loans granted to beneficiaries and supportive advices should be ensured in order to prevent mismanagement of such loan and loan diversion.
- iv. Rural bank should give training to beneficiaries and also ensure that the farmers are educated on incentives given such as insurance on NACRDB loans, interest charged etc.; and the advantage of prompt repayment of loan given.

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