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Loan repayment performance of small holder oil producers in Nigeria: a credit rating approach

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Abstract

This study was designed to investigate the repayment performance of smallholder oil palm producers and processors in Abia State using a credit rating approach. The aim was to develop scoring indexes that will enable the researcher classify the study group as either credit worthy or non-credit worthy using some hypothesized variables as determinants of group membership. Ninety (90) respondents, comprising 54 producers and 36 processors were randomly selected and interviewed. The discriminant analysis technique was employed in analyzing the data and drawing conclusions. In rating the beneficiaries, the scoring index developed identified twenty seven percent of the processors as not being qualified as the model captured only fourteen processors as credit worth as against twenty two processors using repayment rates. The discriminant analysis had high level of accuracy in the error analysis with the group centroid of non- credit worthy respondents being 1.742 while that of the credit worthy group was – 1.216. Using Fisher's function coefficients , data analysis showed that loan-asset ratio ranks top as the most critical positive discriminating variable for credit worthiness, followed by interest rate, income – expenditure ratio and age of beneficiaries as these variables crossed the 1 unit credit worthiness benchmark. The Eigen Value Test used to check the relative importance of the discriminating variables in determining group membership was significant at 2.167 (>1). This means that there exist strong relationship between the discriminant functions and the group variables in classifying the respondents into credit worthy and non-credit worthy groups using the theorized variables.

Keywords: Loan repayment, oil palm producers, agriculture, credit rating, discriminant analysis.

INTRODUCTION

Most innovations in agriculture inevitably increase the capital requirements of farmers. Improving access to finance is an important aspect of fostering development in the oil palm sub-sector. Experience has indicated that loans are essential tools for the adoption of modern practices in agriculture. The need for credit is further stressed by the fact that the bulk of the farmers in the study group produce small marketable surpluses that they can hardly save from their earnings to take advantage of improved technologies and opportunities in the market especially with the current attention being given to bio-fuel (SMU 2004).

In spite of concerted government efforts to provide funds for agriculture in recent times, the majority of oil palm growers and processors do not have access to formal credit. Some of these efforts include the Agricultural Credit Guarantee Scheme (ACGS), National Agricultural Insurance Corporation (NAIC), and the Nigerian Agricultural Cooperative and Rural Development Bank (NACRD) among others. As observed by CBN (2005), though, these efforts/services have resulted in an increased level of credit disbursement and gains in agricultural production, the effects were short-lived, due to the unsustainable nature of the programme. The above corroborates various other studies (Babalola and Odoko 1986, Ukoha and Agwamba, 2002), which identified high rate of loan default/delinquency among borrowers as sore points in credit administration. In most cases, these

efforts and credit programmes were not sustainable as they lacked objective criteria for their administration (Musinguzi and Smith 2000). Banks that support the agricultural sector are often geared towards large collective enterprises and farms. They lack information and expertise to deal with emerging small-scale farm sector. According to Trzeciak - Duval (2003), risk assessment is relatively new and difficult in all cases even more so for the small scale sector where lender–client relationships are not firmly in place, and various aspects of the loan application, evaluation and processing procedures are not yet well established (Pitamber 2003, Cookey 2005).

Without some form of credit, most small-scale oil palm growers and processors have little chance of substantially increasing their production. This brings to the fore, the importance of poverty among the farming population as a factor in the organization of agricultural credit. Often this factor is not fully acknowledged. Poverty is of direct significance because technological improvements must often be adopted with more capital investments and when incomes are low, such risks appear to be great.

The relatively low level of farm income has restricted the operations of the smallholder oil palm growers and processors to small enterprises. This establishes a vicious circle whereby the farmers always remain small producers and relatively poor. The smallholder oil palm growers and processors in Abia State have moderate resources for production and therefore need production credit to break this vicious circle of low income and poverty (Nwosu, 2004). This therefore, underscores the need for more realistic and determined efforts to modernize the oil palm sector through the extension of easy credit facilities to the farmers in this group. This will lead to the transformation of their smallholdings into modern commercial concerns with increased capacity of the beneficiaries to pay their loans.

According to Cottarelli et al (2003), it is widely recognized that for financial intermediation to deepen, it is necessary that financial information on borrowers is of good quality and controllable. This involves ensuring accurate information on financial status of borrowers through improved quality of annual accounts and financial statements, establishment of credit bureaux and possible introduction of rating systems. The ability of borrowers to provide adequate financial statements will encourage expansion of credit and reduce the cost of credit to borrowers which in turn will enhance their ability to repay borrowed funds. These deficiencies increase credit risks and costs for financial intermediaries and undermine the competitiveness of the financial system as borrowers cannot use their track record to secure the best lending terms.

As the country is pre-occupied with the challenges of economic reforms, focusing on agriculture in general and palm oil production in particular would be the right step in the right direction. It is against this background that this study will attempt to determine if the credit facilities of the Oil Palm Growers Association of Nigeria, Abia State Chapter has been able to achieve its objectives. This is in terms of the recovery rate of loans and minimization of loan diversion. Due to poor loan repayment by farmers, credit institutions feel reluctant to grant un-guaranteed loans to farmers. This is a serious problem in agriculture because high level of agricultural production needs to be supported with adequate loans. The farmers need to understand and appreciate the critical variables that influence credit delivery decisions. This is the only way they can take advantage of the various credit programmes of government and ensure the sustainability of such programmes.

Literature Review

Cookery and Ohale (2007), employing a modified 5-scale Likert's response pattern, identified the following as factors that contribute to agricultural loan default: late release of funds (3.04), lack of corporate factors and facilities (3.0), unfavourable repayment schedule (2.95) amount granted too small for meaningful impact (2.56), inadequate loan monitoring and supervision (2.63), diversion of funds (2.73), unwillingness to repay (National cake mentality) (3.45). The above study shows clearly that providing credit to small farmers will by itself accomplish little in increasing food production and raising farmers' income. The result emphasized extension, profitable technology and markets with credit at the appropriate time.

Therefore it is strongly believed that availability of credit will go a long way to alleviating farmers' problems. In addition, credit helps people to smooth out consumption pattern during the lean periods of the year (Binswanger and Khandker 1995, Nwanna, 1995) by so doing, credit maintain the productive capacity of poor rural households (Heidhues 1995).

Since the significance of credit rests on how farmers use it, Nweze (1990) reported that paying hired labour constituted the largest single use to which agricultural credits were put. According to him, 39.7 percent of borrowers used their borrowed sum for this purpose. 4.4 percent spent part of theirs on seeds and 1.5 percent used part on fertilizer purchase. The report indicated that 16.2 percent and 30.9 percent spent part of their loans on children's school fees and hospital bills respectively. Ceremonies/festivals and marriage expenses received 11.8 percent and 14.7 percent respectively. The high percentage use in non-farm activities points to the critical need for measures to check loan diversion and misappropriations.

On their part Mejeha and Obunadike (1998) reported that farmers spent more on adoption of innovation with credit than without credit. This is because the availability

of credit afforded farmers the opportunity to access more farm inputs. The result showed a positive correlation between credit and adoption of innovation. They noted that the rate of adoption of new technology by farmers is generally high if the probability of a change over to new technology, the economic position of the farmers and the effectiveness of the extension agents are high. This emphasizes the fact that the provision of credit should be with support services needed to make the credit facility work.

Dodson (1997) observed that over the short term, demand for agricultural credit would be influenced by incomes and the need to replace capital stock. On the other hand, over the long term, the outlook for farm credit is likely to be influenced by the structure of agriculture and financial institution. The demand for farm credit has been on the rise in recent years and according to Koenig and Doye (2004) credit worthy farmers generally experience competitive edge in the lending markets. They observed that modern agricultural systems are capital intensive, and as such a large portion of capital used in farming is borrowed.

Unfortunately credit is rarely available to the poor at reasonable rates of interest. Nwaru (2004) quoting Hossain (1988), on the study of socio-economic environment and the role of credit, reported that average rate of interest charged on informal credits was 125 percent per annum as compared with 14.6 percent per annum on formal credits. He observed that high interest rate severely limits the production activities that can be undertaken with the loans. Therefore, high-interest credit from non-institutional sources basically finances consumption, for which the poor are forced to take when their physical existence are at stake.

Cookey and Ohale (2007) examined impediments to the flow of credit to small holder farmers in Abia and Rivers States and found that lack of regular monitoring and supervision are important contributory factors. On their part, Njoku and Odii (1991), evaluated repayment performance in Imo State where they found repayment performance to be only 27 percent. The factors which significantly influenced loan repayment were amount borrowed, years of farming experience, major occupation of the borrower, years of formal education, household size, loan period, farm size, farm output, value of assets and interest on loan.

In a similar study Njoku and Obasi (1991), evaluated, loan repayment under the Agricultural Credit Guarantee Scheme Fund (ACGSF) in Imo State. Their result showed that loan repayment was generally poor with only 33.7 percent of the total value of loans paid. The amount of loan received, rate of interests charged on loans and household size were three major determinants of loan repayment.

The repayment of agricultural credit has a profound effect on the attitude of lenders toward financing smallholder-farming activities (Banda 1991). Most of the credit schemes by the state had poor recovery records. World Bank (2002), identified poor administration of credit, which emphasized the disbursement of funds rather than the effective use of loans and problems connected with loan recovery as major culprits. However, high repayment records tend to be associated with single market cash crops and credit programmes based on communal sanction. Lending programmes that have no specialized technical services and rely on third parties to recover loans tend to have low repayment rates.

RESEARCH METHODOLOGY

The Study Area

The study area is Abia State where oil palm farming and processing are undertaken extensively. The state is located in the South eastern part of Nigeria and lies between longitudes 04^{o} 45^{1}, and 06^{o} 17^{1} North, and latitude 07^{o} 00^{1} and 08^{o} 10^{1} East, and occupies an area of 7620 square kilometre with Umuahia as the capital. According to the National Population Commission (NPC, 2006), Abia State is populated by 1,913,917 persons made up of 933,030 males and 971,878 females. With estimated annual population growth rate of 2.0 percent, the present population is about 2,368,574 consisting of 1,160,141 males and 1,208,433 females. This population consists of people in all walks of life with about 65 percent of them engaged in agricultural production (ASPC, 2008).

The state is located in the tropical rainforest zone of Nigeria, where oil palm and other crops thrive extensively. The most prominent and important economic tree of the state is the oil palm, which in past years has been and no doubt will long continue to be Abia State's most valuable asset. In the past three decades, the World Bank oil palm rehabilitation scheme has converted many hectares of land holding to oil palm plantation under the small-holder scheme. Major agricultural and allied activities include the cultivation and processing of cassava, maize, palm wine, palm fruit into garri, maize flour, local dry gin and oil palm produce. Rainfall is often heavy averaging about 1200mm annually and distributed fairly throughout the year. Abia State is divided into 17 Local Government Areas. These are grouped into three agricultural zones namely, Aba, Umuahia and Ohafia zones.

Sampling Technique

The population of this study consists of small holder oil palm producers in the Ohafia, Umuahia and Aba agricultural zones of Abia State. The Local Government Areas selected in the zones were as follows as shown in Table 1:

Table 1. Agricultural Zones and Sampled Local Government Areas

S/N	Zones	LGA's Selected
1	Ohafia	Bende, Isuikwuato and Ohafia
2	Umuahia	Umuahia North, Ikwuano and Isiala Ngwa North
3	Aba	Obingwa, Ugwunagbo and Ukwa West

A multi stage sampling technique was used in this study. The state was stratified into three according to the agricultural zones. In the first stage, Local Government Areas were selected by simple random sampling (SRS) technique. In the second stage, small-holder oil farmers and processor borrowers were randomly selected with names of borrowers from each Local Government Area of 350 producers and 155 processors were obtained from the Oil Palm Growers Association of Nigeria, Abia State Chapter. In all, nine (9) Local Government Areas were selected. Ninety (90) respondents made up of 54 oil palm farmer and 36 processors (six and four respectively for each selected Local Government Area) were chosen for detailed study.

Data Collection

Data for this study were collected from primary and secondary sources. The primary source involved participants – interviews. The secondary sources involve extraction of relevant information from reports, journals, yearbooks, previous research works, annual reports and periodicals. The interviews were done with the aid of structured questionnaire. They were used to interview the borrowers. Efforts to elicit information from the participating banks and the state Agricultural Credit Loans Board were unsuccessful. The investigator and some hired agents from Abia State Planning Commission and Abia ADP enumerators, including field level officers of relevant government agencies were trained on the requirements of each question. Respondent farmers/processors were interviewed at their sites by the investigator and / or the paid agents and information collected on a single visit. Data collection was done in the last quarter of 2008. Data were collected on socio-economic characteristics of the respondents, farm input and output and credit information. Questionnaires filled out were handled in strict confidentiality.

Analytical Techniques

Discriminant analysis model was used to determine repayment performance and credit worthiness of the oil palm borrowers. Nine independent variables were used as discriminatory variables to classify the beneficiaries into mutually exclusive and exhaustive categories (credit worthy and non-credit worthy) based on Repayment Rate (RR) as well as the prediction of the credit worthiness of oil palm borrowers in Abia State to establish the critical causal factors and the nature of association existing between them. The form of explanatory design adopted in this section is the one that believes that when we have random observations of favourable and unfavourable situations on a continuous scale, the best way of finding the critical factors that affect both the favourable and unfavourable situations is to find the most discriminating factors (Ebiringa, 2004). It is therefore, believed that in order to predict the future prospects of loan repayment rate of oil palm borrowers in Abia State, it is important to make use of the factors that discriminate favourably and unfavourably to credit worthiness as established in Asiegbu and Ebiringa (2005).

The Discriminant analysis model classified the beneficiaries by the same set of independent variables used in regressing the loan repayment rate (LRR) into two mutually exclusive categories. Grouping of the beneficiaries into two (2) was based on loan repayment rates (RR). Those whose repayment rates are greater or equal to 0.5 (RR ≥ 0.50) were assigned to group 1 while those below 0.5 (RR < 0.50) were assigned to group 0. Those under group 1 are assumed to be credit worthy while those in group 0 were assumed to be non-credit worthy (Ukachukwu 1996 and Arene 1994). Thus, credit worthiness (CW) was determined as follows:

If RR ≥ 0.50, then CW = Group1

If RR < 0.50, then NCW = Group 0

Where:

RR = Rate of repayment

CW = Credit worthy

NCW= Non-credit worthy

The exact value of the limit of each group for purposes of classification depends on how much premium is put on the relative cost of misclassification to the investigator. More frequently, the cut-off point is usually taken as the midpoint of Z_{cw} and Z_{Ncw} = ½ (Z_{cw} + Z_{Ncw}) because discriminant function analysis assumes equal cost of misclassification (Ukachukwu 1996, Arene 1994, Bauer and Jordan 1971; Peters and Summers 1968).

The model is explicitly presented as:

$Z = b_0 + b_1 z_{1i} + b_2 z_{2i} ..... + b_n z_{ni}$ ...3.11

Where Zi = the ith individual's Discriminant score

b_1 = the Discriminant coefficient for the variable.

The Z_1 is derived by the formula:

$$Z_i = \frac{X_i - \overline{X}}{б}$$

Where Xi = value of the ith independent variable

$\overline{X}$ = mean value of the independent variable

б = standard deviation of the independent variable

For the classification procedure, let each individual's Discriminant score Zi be a function of the independent variables. That is:

$$Z_i = b_0 + b_1 (OIR) + b_2 (LAR) + b_3 (LAC) + b_4 (INT) + b_5 (HHS) + b_6 (FE) + b_7 (EDU) + b_8 (AG) + b_9 (DHS) \quad \ldots 3.12$$

If $Z_i > Z_{crit}$, classify individual as belonging to group 1 (credit worthy- CW), and if $Z_i < Z_{crit}$, classify individual as belonging to 0 (non-credit worthy - NCW). The classification boundary is then the locus of points where

$$b_0 + b_1 X_i + b_2 X_{zi} + \ldots\ldots + b_n X_{zi} = Z_{crit} \ldots \quad 3.13$$

Where X_i = the independent variable

Z_{crit} = the Discriminant value for the Discriminant score.

The method used in the prediction of the factors that determine the credit worthiness of the beneficiaries represented by the repayment rate of oil palm producers in Abia State is the Fisher's linear Discriminant function similar to the one used by Asiegbu and Ebiringa, (2005) and Okpara (2008). Fisher's idea was to base the discriminant rule on a projection $a^T x$ such that a good separation is achieved. This Linear Discriminant Analysis (LDA) projection method is called Fisher's Linear Discriminant Function (Wolfgang and Leopold 2005; and Martin and David 2003)

If $Y = aX$ 3.14

Denotes a linear combination of observations, the total sum of squares of Y, $\sum^{n}_{i=1}(Y-\bar{Y})^2$,is equal to

$$Y^T HY = a^T X^T H X_a \ldots \quad 3.15$$

With the centering matrix

$$H = I - n^{-1} 1_n I_n^T \quad \ldots 3.16$$

$$T = X^T HX \quad \ldots 3.17$$

Substitute equations 3.16 and 3.17 in 3.15 we have

$$Y^T HY = a^T Ta \quad \ldots 3.18$$

Equation 3.18 is the total sum of squares of Y.

Fishers' Discriminant function is to find the linear combination $a^T X_j$ which maximizes the ratio of the between-group-sum of squares to the within-group-sum of squares. Where X is the discriminating variable j, j=1, 2,…, j.

The within-group-sum of squares is given by

$$\sum^{j}_{j=1} Y_j^I H^I Y^I = \sum^{j}_{j=1} a^I X_j^I H_j X_j a \quad \ldots \quad 3.19$$

$$W = X_j^I H_j X_j \quad \ldots \quad 3.20$$

Substitute equation 3.20 in 3.19 we have

$$\sum^{j}_{j=1} a^I X_j^I H_j X_j a = a^I Wa \quad \ldots 3.21$$

Equation 3.21 is the within-group-sum of squares which measures the sum of variations within each group.

Where Y_j= j^{th} sub-matrix of Y corresponding to observations of group j.

$H_j = (n_i \times n_j)$ centering matrix.

The between - group - sum of squares is

$$\sum^{j}_{j=1} n_j (\bar{Y}_j - \bar{Y})^2 = \sum^{j}_{j=1} n_j [a^T(\overline{X}_j - \overline{X})]^2 = a^T Ba \quad \ldots 3.22$$

Where $\bar{Y}_j$ and $\overline{X}_j$ = the means of Y_j and X_j and

$\bar{Y}$ and $\overline{x}$ = the sample means of Y and X

The between-group-sum of squares measures the variation of the means across group.

The total sum of squares is the sum of the within-group-sum of squares and the between-group-sum of squares. That is

$$a^I Ta = a^I Wa + a^I Ba \quad \ldots 3.23$$

Fishers' idea was to select a projection vector (a) that maximizes the ratio $a^T Ba/a^T Wa$. He noticed that the vector (a) that maximizes $a^T Ba/a^T Wa$ is the Eigen-vector of $W^{-1}B$ that corresponds to the largest Eigen-value.

Borrowing this idea, therefore, the discriminating variable is classified based on the one that maximizes the ratio $a^T Ba/a^T Wa$. Thus classify discriminating variable as a determinant of credit worthiness if $a^T Ba/a^T Wa \geq 1$.

EMPIRICAL RESULT AND DISCUSSIONS

In order to arrive at the final profile of variables critical to the determination of creditworthiness using pooled data, the test of equality of group means was employed as a test of the statistical significance of the various alternative functions including determination of the relative contribution of each independent variable. This test is aimed at determining the individual discriminating ability of the variables using F-test. The test relates the differences between the average values of the ratios in each group to the variability spread of values of the ratios within each group. The table shows that all the variables except farming/processing experiences (FE/PE) are significant at 1% level. This indicates that there exist extremely significant differences in these variables between groups (Table 2 and Table 3).

This test is aimed at judging the relative importance of the discriminating variables. This result shows a good estimate since the Eigen value is 2.167(greater than 1) (Asiegbu and Ebiringa, 2005). The meaning is that the higher the Eigen value, the stronger the strength of the association / relationship between the discriminant function and the variables.

The Canonical correlation is a measure of the association between a single discriminant function and the variables which define the group membership. It shows the nature of relationship between the functions and the group variables. From the table 4, the canonical correlation is 0.83. This means that there is a strong canonical correlation between the functions and the group variables. Therefore the discriminant function is able to classify the groups using the theorized variables. The policy implication is that those variables with relatively high percentage contribution to the total discriminant score are major determinants of group membership and credit worthiness. Therefore selection of prospective beneficiaries should be a function of the

Table 2. Test of Equality of Group Means

Variables	Lambda	F-ratio	d/f	d/f2
Income-expenditure ratio (IER)	0.546	(73.289)***	1	88
Loan –asset ratio (LAR)	0.622	(53.429) ***	1	88
Loan acquisition cost (LAC)	0.481	(95.000) ***	1	88
Interest rate (INT)	0.508	(85.237) ***	1	88
Household size (HHS)	0.912	(8.530) ***	1	88
Farming/processing experience (FE/PE)	0.985	(1.348)	1	88
Educational Level (EDU)	0.661	(45.075) ***	1	88
Age of the beneficiaries (AG)	0.753	(28.875) ***	1	88
Distance between home and source of loan in km. (DHS)	0.928	(6.700) ***	1	88

Source: Computer analysis of the field survey data (2008) using SPSS, *** =1% level of significance

Table 3. Eigen Values Test

Function	Eigen values	Percentage of variance	Cumulative percentage	Canonical Correlation
1	2.167a	100	100	0.827

Source: Computer analysis of the field survey data (2008) using SPSS 16.0

Table 4. Classification of Impact of Variables on Loan Repayment Rate of Oil Palm Borrowers in Abia State (Pooled Data)

Discriminating variables	Fisher's function Coefficients NCW (0)	Fisher's function Coefficients CW (1)
Income-expenditure ratio (IER)	9.085	9.858
Loan–asset ratio (LAR)	75.665	60.616
Loan acquisition cost (LAC)	-0.289	-0.151
Interest rate (INT)	31.849	30.729
Household size (HHS)	0.391	0.440
Farming/processing experience (FE/PE)	-2.846	-2.695
Educational level (EDU)	0.200	0.380
Age of beneficiaries (AG)	2.496	2.320
Distance between home and Source of loan in km. (DHS)	0.291	0.315

Source: Computer analysis of the field survey data (2008) using SPSS

magnitude and sign of the coefficients of the included variables in the model, if all other considerations are held constant.

Decision Rule for Inclusion of Variables as Index of Credit Worthiness

If a discriminating variable has a positive coefficient that crosses one unit benchmark in the fisher's function for credit worthy class, it means that the variable is a significant positive index of credit worthiness, implying that we reject the null hypothesis.

From table 3 above, it can be seen that loan assets ratio (LAR) ranks top as the most critical positive discriminating variable for credit worthiness, followed by interest rate (INT), income-expenditure ratio (IER) and age of beneficiaries in that order since they are the factors that crossed the 1 unit credit worthiness benchmark.

The implication from table 3 is that the ratio of loan to assets is the most critical discriminating factor for determining credit worthiness of oil palm borrowers in Abia State followed by interest rate. Another major discriminating variable is the income of the beneficiary in relation to his expenditure in determining credit worthiness. And lastly, age of the beneficiaries also discriminated positively among the groups in determining the credit worthiness of the respondents.

The remaining factors had negative and or coefficients less than 1 unit credit worthiness benchmark hence they are not significant.

Table 5. Wilks' Lambda Test

Test of functions	Wilks Lamda	Chi-Square	d/f	Canonical Correlation
1	0.316	95.109	11	0.829

Source: Computer analysis of the field survey data (2008) using SPSS 16.0

Table 5 shows that the four discriminating variables used in developing our loan repayment rate performance model are able to represent all the other variables that discriminated positively but were unable to cross the 1 unit benchmark to the extent of 82.9% given the model's canonical correlation coefficient of 0.829. Also, the statistical significance of the model developed when tested at 0.01 level, shows that the Chi-Square value calculated was 95.109 which is greater than the tabulated value of 24.70, we therefore conclude that our discriminant model based on the four variables that discriminated positively and were able to cross the 1 unit credit worthiness benchmark is a valid predictor of loan repayment rate performance of the respondents.

CONCLUSIONS AND POLICY RECOMMENDATIONS

The results of the discriminant analyses revealed that among the independent variables hypothesized as determinants of credit - worthiness of the respondents, we had the following: for the processor borrowers, the factors having effects on the credit – worthiness of respondents were, loan acquisition cost (22%), age of the processor (20%), processing experience (13%) and household size (12%). The above are important discriminating variables among the study group.

For the farmer-borrower respondents, the important determinants or discriminating variables were loan acquisition cost (50%), age of farmer (23%), educational level (10%). The group centroid for non-credit worthy farmers was found to be 2.409 while that of the credit worthy farmers was – 1.78. For the processors, the group centroid for credit-worthy processors was found to be 2.466 while that of non-credit worthy processors was – 1.570.

However, using the Fisher's function coefficient to examine the impact of the variables in discriminating among the groups, the following was observed. For oil palm processors, loan asset ratio (LAR) ranks top as the most important discriminating factor while for the farmers interest rate is the most critical discriminating factor followed by income-expenditure ratio (IER).For the error analysis, the level of accuracy obtained were 72% for oil palm processors and 85% for oil palm farmers when the two groups were pooled, the level of accuracy achieved was 78%.

The result of the pooled discriminant analysis revealed that among the independent variables hypothesized as having effects on the credit-worthiness of the respondents, loan asset ratio (LAR), interest rate (INT), income -expenditure ratio (IER) and age of beneficiaries (AGE) are the critical variables for credit worthiness. The group centroid for credit worthy respondents was found to be – 1.216 while that of the non-credit worthy was 1.742. The major determinants of credits worthiness for the pooled data were age of farmer/processor (37%), interest rate 21% and loan acquisition Cost (LAC) (20%).

Using Fisher's function coefficient to examine the impacts of the variables in discriminating among groups in the pooled data, the following result was evident. loan asset ratio (LAR) ranks top as the most critical positive discriminant function for credit worthiness, followed by interest rate (INT), income-expenditure ratio (IER).

For the classification using repayment rate as compared with the discriminant model, twenty seven percent of the processors granted loan were not qualified as only 14 processors were identified by the model to be credit worthy as against 22 processors using repayment rates. For the oil palm-farmer borrowers, 25% were not qualified using the discriminant function. The model identified 23 farmers as credit worthy as against 31 using repayment rate. For the pooled data, also 26% were not identified by the model as credit worthy as 34 respondents were actually credit worthy as against 53 identified using the repayment rate. Overall the result of the model showed 72% correct classification for oil palm processor, 85% for oil palm farmers and 78% for the pooled data.

Considering the immense benefits derivable from a well-administered credit programme and the place of oil palm industries in the emerging global trend of bio-fuel, some recommendations based on the findings of this study are necessary. This is to improve the repayment performance of the beneficiaries of such schemes.

- Interest rate remains a critical factor in securing credit and repaying same. The negative coefficient of interest rate shows that the higher the interest rate, the lower the repayment rate. It should be noted that interest rate performs dual function of rationing credit and regulating the risk composition of the credit provider (see Hoff and Stiglitz 1993). High interest rate impacts negatively on the credit worthiness of beneficiaries and attracts only riskier businesses. To ensure high repayment rate and high level of credit worthiness of beneficiaries, optimal interest rate policies that make for optimal credit provisioning and minimize the risk

composition of the credit provider should be pursued.

- A loan delivery process needs to be developed that has minimal cost implication, so that beneficiaries will not spend much money to obtain a unit of loan. The impact of loan acquisition cost which stands at 33% in the model used in this study is instructive. This has become more important at this time of financial crises which requires a more realistic approach to effective prudential regulations at the institutional and micro economic levels in order to address fully the wider systemic risk. This will require measures aimed at strengthening capital and liquidity requirements so as to reduce cost of acquiring a unit of loan.
- Based on the outcome of this study, loan should be giving to people who have stable source of income, low loan-asset ratio, large hectares of land. The use of scoring method used in this study will eliminate the complicated, cumbersome and time consuming procedures which result in delays in approval and in loans not being made available when required. Again deserving ones will have access to credit under fair and just conditions without having their operations negatively affected by red-tape and excessive interest charges. In addition, adequate regulatory standards must be in place to protect credit providers and borrowers alike. A serious environment of repayment discipline must be instilled through credit scoring of applicants. This will ensure that applicants receive loan on merit.
- The results of the estimates serve as pointer for policy directions. Credit worthiness, loan acquisition, and repayment were significantly affected by the age variable. The younger the beneficiaries the better the expected outcome. Therefore, policies that would make credit facilities more youth friendly, attracting the youths to live in the rural areas and take up oil palm farming and processing as a means of livelihood should be put in place. A good example would be the youth in oil palm production and the re-invigoration of the young farmers' club (dedicated to oil palm production) as being currently championed by PZ industries Plc.
- It is recommended that more researches should be conducted into this aspect of agricultural finance. There is need for an agricultural credit reference bureau which should provide information on agricultural credit clients so as to aid decision making. This is in view of the fact that agricultural production activities are time specific with no room for unnecessary delays. Credit rating will provide information on loan applicants for objective and timely consideration. The integration of biometric data will prevent fraud and greater transparency on the debtor side and also greater opportunity for credit acquisition

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