

Full Length Research Paper

Analysis of creditworthiness and loan repayment among bank of agriculture loan beneficiaries (Poultry farmers) in Cross River State, Nigeria

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Due to the high rate of defaults amongst loan beneficiaries in Nigeria and Cross River State in particular, this study examined creditworthiness and loan repayment of poultry farmers in Cross River State. Specifically, the study assessed credit worthiness of borrowers, identified factors that discriminate between credit worthy and non credit worthy farmers and analyzed factors that influence the farmers' ability to loan repayment. A total of 120 poultry farmers were used in the study. Data were collected by questionnaire and analyzed by means, frequencies, percentages, discriminant analysis and multiple regression techniques. The results revealed that 51.7% of the respondents were credit worthy. Also, Farmers with better educational level and large farm sizes were non credit worthy. While farmers with large total operating expenditure-income ratio, longer years of farming, older farmers with adequate supervision were credit worthy. The results of the linear regression model showed that farmers with large Loan amounts, better educational level, larger farm income, late disbursement and large farm sizes repaid their loans more. An increase in these variables increased their repayment ability. While farmers who were defaulting in their loan repayments were supervised more than those who were not defaulting. The study recommended that older and experienced farmers should be taken in to consideration when loan applications are made.

Key words: Discriminant analysis, poultry farmers, loan repayment.

INTRODUCTION

Agriculture has traditionally been acknowledged as the mainstay of the Nigerian economy. The primary place it occupies in providing food and fibre for the people has made it the most single factor in influencing the standard of living of many people in developing countries, particularly Nigeria (Chigbu, 2005; Olagunju and Adeyemo, 2007; Akande et al., 2008). In terms of

employment, agriculture is by far the most important subsector in the Nigerian economy because it engages nearly 70% of the labour force ((Okuneye, 2002).). Its performance in the development process in the 1960s was very commendable. According to Lawal and Ette (2006), the sector accounted for well over 80% of the export earnings and about 50% of government revenue

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during this period. Unfortunately, over the years, the sector has witnessed tremendous decline in its contribution to the national output. One of the reasons for the decline in the contribution of agriculture to the economy of Nigeria is the lack of a stable national credit policy and paucity of credit institutions which can assist farmers (Afolabi, 2010; Nwachukwu et al., 2010). Credit is a crucial factor in the development of the rural sector. Access to credit facilities by these poor rural people has the potential of making the difference between grinding poverty and economically secured life as well as enhancing agricultural productivity (Zeller and Sharma, 1998).

One of the problem confronting small scale farmers in Nigeria is inadequate capital despite the fact that small scale farmers produce the bulk of the food consumed locally and some export crops which generate foreign exchange to the country (Ojo, 1985). It can be observed that as early as 1973, the government had realized the role that credit could play in improving the performance of the agricultural sector. This led to the establishment of the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB) now named Bank of Agriculture (BOA) to address the problem of agricultural credit supply. This was followed by the Agricultural Credit Guarantee Scheme Fund (ACGSF) which was fully guaranteed by government, in 1979. It is widely believed that the adoption of new or improved technology and innovations, cost money and most Nigerian farmers (about 7 out of every 10) are poor, not having the money to buy new technologies that can improve their productivity (Akande et al., 2008).

Despite government programmes and policies aimed at channeling credit to farmers, their credit problems have persisted as farmers still cite credit as one of the major barriers to high agricultural productivity (Nwachukwu et al., 2010). For example, since the establishment of the NACRDB in 1973 (now known as Bank of Agriculture) government had continued to be interested in agricultural credit, in observing the lapses in the NACRDB lending system, six years after, in 1979 the ACGSF was instituted with the aim of providing some measure of risk coverage as incentive to commercial banks to increase their lending to agriculture. This option was pursued by government due to the reluctance by commercial and merchant banks to lend to the agricultural sector.

About 37 years after NACRDB was established and 31 years after the establishment of the ACGSF, one would have thought that the problem of agricultural credit inadequacies would have been solved. Unfortunately, the problem is still very much around and several factors have contributed to this problem. These factors are lender's and borrower-related. According to Schmidt and Kropp (1987), Atieno (2001) and Akande et al. (2008), the lender related factors include institutional bottlenecks created by the institutions, which can be observed in the prescribed minimum loan amounts (credit inadequacy),

complicated application procedures, restriction of credit for specific purposes and delay in loan delivery. There is also the problem of adverse selection by the lender. On the borrower's side, are problems related to credit worthiness which makes most formal credit institutions to deny the farmers access to credit; non-repayment of loans which has led to perennial low recovery rates, poor management procedures, poor loan utilization, loan diversion and unwillingness to repay (Osakwe and Ojo, 1986; Awoke, 2004). Also are problems associated with the occurrence of natural hazards. As such, every effort which encourages loan default among borrowers ought to be reversed because of its adverse effects (Adegbite, 2009; Nwachukwu et al., 2010). The objectives of the study were to assess repayment performance of the borrowers, analyse factors that discriminate between credit worthy and non credit worthy loan beneficiaries and analyse the factors that influence loan repayment.

LITERATURE REVIEW

Credit worthiness is a function of ability and willingness to repay loans (Agu, 1998). Farmers may be either creditworthy or not creditworthy. The discriminant function analysis is used for predicting membership into these two mutually exclusive groups (Tabacknick and Fidell, 1996). Empirical work by Arene (1993) showed that income, farm size, age of farmers, farming experience and level of formal education of farmers contribute positively to the creditworthiness of farmers. The distance of the farmer's residence from the source of loan reduced his credit worthiness. The classification performance of the discriminant function was about 94%. The higher the rate, the better the prediction power of the function (Arene, 1993).

Furthermore, Nwankwo (2004) reported that the level of education made the highest absolute positive contribution to the total discriminant score, followed by farm size and family size. On the other hand, age, loan size, annual farm income and farming experience made negative contributions. The overall classification performance of the function was 100%. Ezeh (1993) also revealed that age of the farmers, annual farm income, farm size and family size made positive contributions to the total discriminant score. The group cases correctly classified was 56%. Ezeh (2003) also showed that the nearer the farmers home to a credit lending institution the greater the probability that the farmer will be classified as credit worthy. The variables namely off farm income, farming experience and family size contributed positively to the credit worthiness of the farmers. On the contrary, farm income farm size and farmers age made negative contributions. The classification performance was 70%.

Nwachukwu et al. (2010) used discriminant analysis to discriminate between performing loan beneficiaries and non-performing loan beneficiaries. The results showed

that, education, gender, farming experience, household size, loan period, income, amount borrowed and distance made positive contributions to the total discriminant score while age and farm size contributed negatively. The classification performance of the function was 92.0%.

Onyenucheya and Ukoha (2007) grouped farmer borrowers into two groups based on loan repayment levels. The study revealed that credit worthiness is directly influenced by age, income, educational level, farm size, and total operating expenditure – income ratio of the farmer borrower and is inversely related to outstanding loan – total asset ratio and distance between home and loan source. The classification performance was 75.6%. Turkey (1991) in his research reviewed four alternative credit scoring models for agricultural loans, namely the linear probability model discriminant analysis, logit and probit. The econometric models were based on 9,403 loan applications from Canada's Farm Credit Corporation. Results indicated that there was no great deal of difference in the underlying assumptions and statistical properties. The predictive accuracies of the four models were as follows: Discriminant analysis 71.5%, logit 69.7%, probit 69.4% and linear probability model of 67.1%.

Njoku and Odii (1991) used regression analysis to identify factors that significantly influence repayment. The result revealed that the factors that significantly influence repayments are amount borrowed, farming experience major occupation of the borrowers, level of education, household size, loan period, farm size, farm output, value of asset and interest on loan.

Olagunjiu and Adeyemo (2007) from their study on determinants of loan repayment decision among small holder farmers in south western Nigeria, showed that delay in disbursement, distance of farm location to the bank, cost of obtaining the loan, non-frequent visit made by the bank officials and low borrowing frequency from the institution tend to reduce repayment ability. Also volume of loan, level of education farm size, and farming experience tends to increase repayment ability. Afolabi (2010) in his study of loan repayment among small scale farmers in Oyo state showed that family size and nonfarm expenses had negative signs which indicated that an increase in the quantity of these variables will lead to a decrease in the level of loan repayment among the respondents' *certeris paribus*. Farming experience, amount granted, gross income, farm size, interest rate charged and non farm income had positive signs which indicated that an increase in the quantity of these variables will lead to an increase in the respondents' level of loan repayment all things being equal.

According to Oladeebo and Oladeebo (2008) in their study, determinants of loan repayment among small holder farmers in Ogbomosh agricultural zone Oyo state Nigeria, the positive coefficient of amount granted may enable farmers to adopt agricultural innovations which can translate to increase in the level of income and hence

high level of repayment. The results showed that level of education and farming experience made positive contribution to loan repayment while age had a negative contribution to repayment.

Similarly, Onyenucheya and Ukoha (2007) in their study of loan repayment and credit worthiness among NACRD loan beneficiaries in Abia state, showed that determinants of loan repayment were amount of loan, income, distance between home of a farmer borrower and loan sources etc. The results showed that loan amount had a positive coefficient, suggesting that increase in loan repayment as the loan amount increases. Annual income had a positive coefficient showing that the more productive the enterprise is the higher the probability of loan repayment.

Wenner (1995) studied means to improve information transfer and loan repayment performance through group credit. A multinomial logit model was specified to consider the effect of membership screening on composite states of delinquency using the dependent variable as 1, 2, 3 meaning absolutely no delinquency, some internal but no external and both internal and external delinquency respectively. Set of explanatory variables such as screening, visit, number of monitoring inspections, Agricultural years, infrastructural index, saving mobilization, organizational score etc. Results showed that screening, visit agricultural years and organizational scores all contribute to the likelihood of the outcome. Visit has a negative sign, suggesting that a higher number of visits are associated with troubled groups. Agricultural year was positive and large in magnitude. As expected organizational strength contributes positively to the likelihood of repayment, likewise higher average amount of savings increase repayment probability at both levels (1 and 2). The results also showed that when observable individual credit worthiness was controlled for, it was found that individual who belong to groups that engaged in screening were less likely to be delinquent. This indicated that screened groups were using additional information on character attributes that are not easily obtainable by outsiders. Wenner (1995) also attested that the institutional design of group lending results in informational efficiency gain.

THEORETICAL ISSUES

This work is based on the theory of capital accumulation. The crucial role of capital in economic growth and development process has been recognized since the pre-Keynesian era when the classical ideology monopolized economic thinking and policy formulation. Without doubt, every nation in the world still lays tremendous emphasis on capital accumulation by stressing the need for raising the level of investment in relation to output. This emphasis is traceable to the short-term fiscal policies and national development plans of both the developed and

Table 1. Distribution of respondents by bank location in the study areas.

Location	Total number of due loans	50% of due loans
Calabar	110	55
Akamkpa	40	20
Obubra	40	20
Ogoja	50	25
Total	240	120

Source: NACRDB (2010).

the developing economies over the past four decades (Ahortor and Adenutsi, 2009). In fact the development of the industrialized countries can be said to be as a result of the heavy capital investment, financed mostly from capital accumulation. Rapid and sustainable real economic growth is a necessary condition for economic development. This would also imply that for growth to occur in the developing nations there is the need for relatively stable macroeconomic environments which are indicators for low risks and conditions for attracting investment and boosting entrepreneurial activities.

From the standpoint of development economists, it is generally believed that capital accumulation is the springboard for the escape of low level equilibrium trap involving a vicious cycle of poverty (Schultz, 1977). According to Jhingan (1999), the vicious cycles of poverty in under developed countries can be broken through access to capital for investment. Due to low levels of income in these countries, demand, production and investment are deficient. This has resulted in the deficiency of capital goods which can only be removed by capital accumulation.

MATERIALS AND METHODS

Data

Purposive and random sampling techniques were employed in the study. This was applied after collecting a list from all the four branches of the NACRDB in the state. In each branch a list of all the poultry farmer borrowers in the years 2008 and 2009 were obtained from the bank. From the list, fifty percent of the poultry famer borrowers whose loans were due were randomly selected using the lottery method from each of the four locations. The selection was done in proportion to size (Table 1). A total of one hundred and twenty respondents were used in the study. Structured questionnaire was used to elicit information from the respondents.

Data analysis involved the use of mean, frequencies, percentages, discriminant analysis and the multiple regression analysis.

Analytical technique

The discriminant analysis was used to classify the farmers into two mutually exclusive and exhaustive categories. Using the loan repayment value as a basis, loan beneficiaries were classified into two groups. Group one consists of farmers who had not completed

payment of the loan borrowed, whereas group two consists of farmers who had repaid all on or before due date (Onyenucheya and Ukoha, 2007). Farmers in group two were assumed to be relatively credit worthy while those in group one were assumed to be relatively non-credit worthy.

The model is presented implicitly as:

$$D_i = b_0 + b_1 Z_{i1} + b_2 Z_{i2} + \dots + b_n Z_{ni} - \infty \tag{1}$$

$$Z_i = X_{ij} - \bar{X}_j \tag{2}$$

Where Z_i = the i^{th} individual's discriminant score or the contribution of each independent variables to the total discriminant score (D_i); D_i = Total discriminant score; X_{ij} = The i^{th} individual value of the J^{th} independent variable; b_{ij} = the discriminant coefficient for the j th variable; \bar{X}_j = mean value of the independent variables; ∞ = standard deviation of the independent variables; Let each individual score Z_i be a function of the independent variables; that is (Onyenucheya and Ukoha, 2007):

$$Z_i = b_0 + b_1 X_{ij} + b_2 X_{2j} + \dots + b_n X_{ni}$$

Classification procedure is as follows if $Z_i \geq Z_{crit}$ classify individual i as belonging to group two (credit worthy farmers) and if $Z_i < Z_{crit}$, classify individual i as belonging to group one (Non credit worthy farmers).

The classification boundary is the locus of points where:

$$b_0 + b_1 X_{1j} + b_2 X_{2j} + \dots + b_n X_{ni} = Z_{crit} \tag{3}$$

The variables used in the discriminant analysis are; Age = age of the farmer in years; FX = Farmer Supervision (number of times the farmers were supervised by loan agents); Sex = 1 for female, 0 for male; ED = Educational level (number of years of schooling); FE = Farming experience (number of years of farming); DS = Distance between home and source of loan (km); FS = Farm size (number of birds); LAR = Loan-Asset Ratio (loan divided by asset); OER = Total operating expenditure- income ratio (Total operating expenditure divided by income).

The multiple regression analysis was used to determine factors that influence loan repayment among farmer borrowers. Using the ordinary least squares estimates in estimating the regression model, four functional forms namely the linear, semi-log, double-log and exponential were tried out and the one that gave the best fit was chosen. This model was implicitly stated as:

$$Y_1 = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, U) \tag{1}$$

Where: Y_1 = Amount of loan repaid per farmer in Naira; X_1 = Amount of loan borrowed per farmer in Naira; X_2 = Age of the farmer in years; X_3 = Sex of the farmer (sex=0 for male and 1 for female); X_4 = Educational level (number of years of schooling); X_5 = Farming experience (number of years of farming); X_6 = Household size (no of family members); X_7 = Loan supervision (number of times farmers were supervised by loan agents). X_8 = Farm income per farmer in Naira; X_9 = Distance between home and source of loan in Kilometers; X_{10} = Farm size (number of birds); X_{11} = Disbursement lag in months, and U = Error term.

N/B one US Dollar is equivalent to One hundred and sixty Naira (1USD= 160N).

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

Table 2 showed the distribution of respondents by sex.

Table 2. Socio-economic characteristics of the respondents.

Variable	Frequency	%
Sex	64	53.3
Females	56	46.7
Males	120	100
Age groups (years)		
21-30	16	13.3
31-40	45	37.5
41-50	47	39.2
51-60	11	9.2
Above 60	1	0.8
Total	120	100
Mean	40.2	
Marital status		
Single	5	4.2
Married	90	75
Divorced	15	12.5
Widowed	10	8.3
Total	120	100
Household size		
1-5	23	19.2
6-10	85	70.8
11-15	12	10.0
Total	120	100
Mean	8	
Income		
Naira 000'		
101-200	56	46.7
201-300	34	31.7
301-400	3	2.5
401-500	1	0.8
501-600	22	18.3
Above 600	-	-
Total	120	100
Mean	262.8	
Educational level		
Primary school completed (6 years)	31	25.8
Secondary school completed (12 years)	30	25
OND/NCE school completed (14/15)	12	10
HND/BSc. (16 years)	44	36.7
M.Sc (18 years)	3	2.5
Total	120	100
Mean	12.4	

Source: Field Survey (2010).

As shown in this table, 53.3% of the respondents were females and 46.7% were males. From this result, it showed that the percentages of males who were poultry

Table 3. Agricultural characteristics of the respondents.

No of birds	Frequency	Percentage
101-200	43	35.8
201-300	41	34.2
301-400	18	15
401-500	18	15
Total	120	100
Mean 260		
Experience year		
1-10	57	47.5
11-20	49	40.8
21-30	13	10.8
Above 30	1	0.9
Total	120	100
Mean	12.0	

Source: Field Survey (2010).

producers were less than the female's producers. From the result it was also seen that women are actively involved in poultry production. The mean age of the respondents was 40.2 years. The results revealed that 75% of the respondents were married, with a mean household size of 8 persons. In the study area as in other African settings, most households are made up of a man, wife/wives, children and extended family members. All these form the household size that pool and use resources of the household. The household size affects the credit demand and use (Bime, 2007). The mean annual income of the farmers was 262,800 thousand naira. All had formal education (100%). Years of formal education ranged from 6 years of completed primary education to 18 years of higher degrees. The mean duration for education was 12.4 years. The level of education may indicate productivity potential both on and off farm (Abdulai and Delgado, 1999; Bime, 2007). This means that the more educated a farmer is, the more likely he/she is to work off the farm. Many studies contend that farmer's education influences farm productivity by affecting a farmer's input and output decisions (Khandler, 1988; Bime, 2007). The number of years of formal education is known to influence the behaviour, value, value, exposure and opportunities of an individual.

Agricultural characteristics of the respondents

Table 3 shows the agricultural characteristics of the respondents. The poultry producers were layers and broilers farmers. The mean number of birds kept was 260. The respondents farming experience measured the number of years the respondents have been consistently engaged in farming occupation (Table 3). The mean farming experience was 12 years.

Table 4. Farm asset value of the respondents to amount of loan obtained for poultry farmers.

Asset value in 000'Naira	Frequency	Loan obtained in 000' Naira	Excess credit in 000' Naira
300	1	240(100)	60
350	18	100(88.8) 240(11.1)	250 110
400	29	150(31.0) 160 (58.6) 240(10.4)	250 240 160
450	1	240(100)	210
500	19	150(26.3) 200(68.4) 240(5.3)	350 300 260
600	19	100(47.4) 240(52.6)	500 360
650	10	240(10.0) 250(90.0)	400 410
800	1	350(100)	450
900	1	500(100)	400
1000	21	500(100)	500

Source: Field Survey (2010). Figure in parentheses are percentages.

Analysis of credit worthiness of the respondent

Table 4 shows farm asset of the respondents and loan obtained in thousands of naira. According to this table, the farm asset value ranges from 300,000 to one million naira. The respondents with asset value of 300,000 naira, result showed that all of them obtained loans of 240,000 naira with an excess credit of 60,000 naira. The result implied that all of them in that group obtained loan that were lower than their asset value. For those with asset value of 350,000 naira, the survey result revealed that 88.9 and 11.1% of them obtained loans of 100,000 and 240,000 naira respectively, with an excess credit of 240,000 and 60,000 naira respectively. For those with asset value of 400,000 naira, the survey result revealed that 31% of them obtained loans of 150,000 naira, while 10.4 and 58.6% obtained loans of 240,000 and 160,000 naira. Their excess credits were 250,000, 160,000 and 240,000 naira respectively. Those with asset value, 450,000 naira, all of them obtained loans of 250,000 naira and their excess credits were 210,000 naira. For those with asset value of 500,000 naira, the result showed that 26.3% of them obtained loans of 150,000 naira while 68.4% and 5.3% obtained loans of 200,000 and 240,000 naira respectively and their excess credits value were 350,000, 300,000 and 260,000 naira

respectively.

For those with Asset value of 600,000 naira, results showed that 47.4 and 52.6% of them obtained loans of 100,000 and 240,000 naira respectively and their corresponding excess credits were 500,000 and 360,000 naira respectively. For those with asset value of 650,000, result obtained showed that 10 and 90% of them obtained loans of 240,000 and 250,000 naira respectively and their corresponding excess credits were 400,000 and 410,000 naira, respectively.

For those with Asset value of 800,000 naira, results showed that all of them obtained loans of 350,000 naira with excess credits of 450,000 naira. Those with Asset value of 900,000 naira, result showed that all of them obtained loans of 500,000 naira with an excess credit of 400,000 naira. Those with Asset value of 1,000,000 naira, results showed that all of them obtained loans of 500,000 naira with excess credit of 500,000 naira. From the table, it can be seen that all the respondents were credit worthy at the point the loan was obtained, but when the loan was due, not all that were credit worthy as previously assumed were credit worthy.

Table 5 shows respondents' credit worthiness based on their loan repayment basis. Credit worthy beneficiaries consisted of borrowers who had completed payment of the loan on or before the due date while the non credit

Table 5. Credit status of loan beneficiaries.

Enterprise credit status	Poultry (%)
Credit worthy loan beneficiaries	62(51.7)
Non credit worthy loan beneficiaries	58(48.3)
Total	120(100)

Source: Field Survey (2010). Figures in parentheses are percentages.

Table 6. Discriminant analysis classification for credit worthy and non credit worthy borrowers.

Actual group	Predicted group credit worthy	Non credit worthy	Total
Credit worthy	59	3	62
Non credit worthy	3	55	58
Ungroup cases	0	0	0
Percentage correct prediction	94.8	95.2	95

Source: Data analysis (2010).

worthy beneficiaries consisted of borrowers who had not completed payment after due date. Result from field survey revealed that 51.7% of the respondents had repaid the entire loan. However, 48.3% of the respondents had not completed payment of the entire loan.

The validity of the discriminant function was derived from the classification of results of the respondents into credit worthy and non credit worthy, the classification results were showed in Table 6. The function was able to classify 59 as credit worthy out of 62 representing 95.2% while 55 were classified as non-credit worthy out of 58 representing 94.8%. This gave an average correct classification of 94.0%. The implication is that, the information provided by the discriminant analysis will help the study to make recommendation to the banks in order to avert defaults.

Factors that discriminate between credit worthy and non credit worthy loan beneficiaries

This was achieved by giving the mean a standard value of zero and a standard deviation of 1. The standardized coefficients and their related statistics are presented in Table 5. The analysis showed that the result was significant at 1% level with a canonical correlation of 0.857, the Wilk Lambda of 0.266 and a chi square of 150.468. The relative high canonical correlation of 0.857 and a low Wilk Lambda of 0.266 indicated that the discriminant function developed in this study provides significant amount for measuring credit worthiness of farmer borrowers. The Wilk Lambda, which is the ratio of the within-group sum of square to the total sum of squares of the groups, was significantly low. Large Wilk Lambda ratio indicates no differences between the two groups while a small value indicates there are differences.

The Eigen value also called the characteristics root for each discriminant function reflects the ratio of importance of the dimensions which classify cases of independent function. The higher the Eigen value, the higher the discriminant score. The canonical correlation which is the squared canonical correlation is the percent of variations in the dependent discriminated by the set of independent variables in the discriminant analysis. It is also the canonical correlation of each discriminant function with the discriminant scores.

A canonical correlation close to one means that nearly all the variance in the discriminant scores can be attributed to group means differences. The estimated standardized canonical discriminant function coefficient was subjected to chi-square test of significant. The calculated chi-square at 5% level of significance was found to be 150.468 whereas the tabulated value at same level of significance was 16.29. Since the calculated chi-squared was greater than the tabulated value we rejected the null hypothesis at 0.050 levels. This implied that all the discriminant coefficients were not equal to zero.

The implication is that the combined estimated function coefficients developed in the course of this study can be used to discriminate between relatively credit worthy and relatively non credit worthy farmer borrowers as initially defined.

The coefficients and statistics resulting from the discriminant analysis (Table 7) showed that the variables entered in the function were able to discriminate between credit worthy and non-credit worthy farmer borrowers. The standardized discriminant coefficient usually does not show the relative importance of the different variables. This was achieved by calculating the correlation between the values of the discriminant function and the coefficients of the variables. The results gave the pooled-within-group correlation between the discriminating variables and the canonical discriminant

Table 7. Standardized canonical discriminant function coefficient and related statistics.

Variable	Co-efficient
Age	0.051
Loan supervision	0.089
Sex	0.173
Education	-0.745
Farmer experience	0.085
Distance	0.168
Farm size	-0.435
Loan-asset ratio	0.359
Exp-income ratio	0.716
Eigen value	2.765
% of variance	100
Canonical correlation	0.857
Wilks lambda	0.266
Chi-square	150.468
Degree of freedom	9
Significance	0.000

Source: Data analysis.

Table 8. Pooled within groups correlation between discriminating variables and standardized canonical discriminant functions.

Variable	Co-efficient
Education	-0.648
Total operating expenditure to Income ratio	0.627
Farming experience	0.153
Loan supervision	0.136
Farm size	-0.133
Age	0.117
Distance	-0.049
Sex	-0.024
Loan asset ratio	-0.022

Source: Data analysis (2011).

function represented in Table 8. These values effectively rank the variables according to their discriminating contributions.

The values in Table 8 indicate that educational status was the most important discriminating variable between credit worthy and non credit worthy poultry farmer borrowers. This was followed by total operating expenditure to income ratio, farming experience, loan supervision, farm size, age, distance, sex and loan to asset ratio. The variable with negative signs indicates that the function value was negatively associated with the variable. The sign however did not reduce the relative importance of the variable as a discriminator; rather it enhanced the explanation of the relationship. Table 8 showed that most of the variables made some

contribution to the borrower's credit worthiness. Total operating expenditure to income ratio, loan supervision, farming experience, and age made positive contributions while level of education, farm size, sex of the farmer, distance between home and source of loan of the borrowers and loan to asset ratio made negative contributions.

The positive sign obtained for total operating expenditure to income ratio, loan supervision, farming experience and age suggests that a farmers borrower's chances of belonging to the group of credit worthy farmers improves as the values of the positive variables increases. The positive sign obtained for total operating expenditure to income ratio is against a *priori* expectation. The negative sign of educational level, farm size, distance between home and source of loan of the borrowers loan to asset ratio and sex of the farmer, suggests that farmers borrower's chances of belonging to the group of non credit worthy farmers increases as the value of the negative variables increase. The negative sign obtained for level of education and farm size is against a *priori* expectation.

The coefficients obtained in the discriminant analysis were further subjected to a statistical test for significance. This was to find out the level of significance of the contributing variables. The test on Table 9 was achieved by obtaining f-values for each of the variables. The result showed that out of the nine variables six were statistically significant. These were age, loan supervision, educational level, farming experience, farm size and total operating expenditure-income ratio. This further confirmed the earlier findings on the key variables.

The result of the discriminant analysis showed that educational status and total operating expenditure-income ratio were the most important discriminators between creditworthy and non creditworthy loan beneficiaries.

Determinants of loan repayments

The ordinary least squares (OLS) regression analysis was carried out to determine factors which influence loan repayment of borrowers. Four functional forms were tried: Linear, semi logarithms, exponential and the double logarithms functions. The results of the estimations of loan repayments are presented in Table 10. The linear functional form was found to be the lead equation of the regression.

The regression results is significant at 1% level and the coefficient of determination (R^2) was 0.94(Adjusted R^2 "0.937). This implies that the included variables were able to explain about 94% of the total variations for the determinants of loan repayment. The F-ratio was 161.560 and is significant at one percent level, implying that the joint effects of all the included variables were significant.

The results revealed that six out of the eleven variables were significant; these were loan amount, education,

Table 9. Significant level of the discriminating variables.

Variable	Coefficients wilk lambda	f-value	Significance
Age	0.963**	4.483	0.036
Loan supervision	0.951**	6.033	0.015
Sex	0.998	.184	0.669
Education	0.463***	136.882	0.000
Farming experience	0.939***	7.686	0.006
Distance	0.994	0.772	0.381
Farm size	0.953**	5.757	0.018
Loan asset ratio	.999	0.153	0.696
Topex income ratio	.480***	128.075	0.000

***, **, * = Significant at 1, 5 and 10% level. Source: Data analysis (2011).

Table 10. Determinants of loan repayment.

Variable	Linear +	Double log	Exponential	Semi log
Intercept	-114316.2(-3.727)***	-8.827(-6.598)***	9.322(27.859)**	-3277258(-18.015)***
Loan amount	0.699(12.445)**	0.694(4.822)***	2.88E-006(4.703)***	153274.24(7.833)***
Age	-66.690(-0.168)	0.059(0.477)	0.004(0.872)	-10791.912(-0.668)
Sex	-9794.625(-1.350)	-0.193(-1.838)*	-0.168(-2.118)**	-5199.995(-0.364)
Education	6284.920(6.237)***	0.338(3.171)***	0.059(5.379)***	50725.414(3.503)***
F. Experience	-883.035(-1.404)	0.009(0.117)	-0.001(-0.120)	-12597.097(-1.233)
Household size	-1484.007(-1.300)	0.011(0.103)	0.002(0.175)	-3225.811(-0.227)
Visit	-5406.219(-1.862)*	-0.459(-2.864)***	-0.022(-0.696)	-29569.234(-1.356)
Farm income	0.130(2.470)**	0.686(4.332)***	4.13E-007(.721)	103776.16(4.820)**
Distance	-742.418(-0.545)	-0.081(-1.060)	-0.029**(-1.960)	4515.920(0.435)
Farm size	256.996(3.668)***	0.324(1.674)*	.003(3.623)***	53972.035(2.048)**
Disbursement lag	1258.870(2.081)**	0.617(6.019)***	.035(5.249)***	-7243.271(-.520)
R ²	0.943	0.864	0.841	0.893
AdjR ²	0.937	0.850	0.824	0.882
F ratio	161.560***	62.532***	51.743***	81.735***

Source: Data analysis (2011). Figures in brackets are t- values. ***, **, * = Significant at 1, 5 and 10%. + = the lead equation.

farm income, farm size, loan supervision and disbursement lag.

The amount of loan obtained had a positive coefficient and is significant at one percent level, suggesting increase in loan repayment as the loan amount or size of loan increases. This is possible due to the advantages associated with the economics of scale, which comes about through expansion of productions and purchases of farm equipments (Okorji and Mejeha, 1993). Education which is the number of years of schooling had a positive coefficient and is significant at one percent level. This implies that the higher the schooling years of the respondents the higher the repayment of loan. Literate farmers repay more of the loans obtained than illiterate ones, having acquired better skill knowledge of poultry farming and understood the advantages of prompt loan repayment and not regarding such loans as their own

share of the national cake. The annual farm income had positive coefficient and significant at five percent level, showing that the more productive the enterprise is the higher the repayment of loan. Farm size of the respondents had positives coefficients and is significant at five percent level. As farm size increases, income increases with better farm management practices and ability to repay the loan would increase. Disbursement lag was significant at five percent level with a positive coefficient. This implies that the longer the disbursement lags the higher the repayment of loans.

On the contrary, loan supervision had a negative coefficient and significant at ten percent level. This implies that the more the loans were supervised the more the farmers were unable to repay their loans. The possible reasons for this could mean that the loan agents (bank officials) visit loan beneficiaries who were

defaulting more than those who were not defaulting (Wenner, 1995).

In terms of *a priori* expectations disbursements lag and loan supervisions were contrary to expectations, all were in line with *a priori* expectations.

CONCLUSION AND RECOMMENDATIONS

The major conclusion derived from this study was that credit worthiness is influenced by educational level, farm size, total operating expenditure-income ratio farming experience, age and loan supervision. The classification of the discriminant analysis showed that 4.8% of the total respondents that had been classified as credit worthy were statistically not credit worthy and 5.2% of those that had been classified as not credit worthy were statistically credit worthy. This information provided by the discriminant analysis will help the bank avert defaults.

It is therefore recommended that more supervision should be exercised on loan beneficiaries so as to encourage prompt repayments of loan. It also therefore recommended that banks should consider those with high educational levels if higher percentage of repayment is to be achieved. The bank should include a training package for its loan beneficiaries in order to improve their skill and knowledge of poultry husbandry practices. The banks should consider aged and experienced during loan approval. To facilitate effective credit use, the bank should put more emphasis on credit management training programs to assist farmers manage their loans more efficiently.

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