CREDIT WORTHINESS AND LOAN REPAYMENT PERFORMANCE AMONG FARMER COOPERATORS IN OWERRI AGRICULTURAL ZONE OF IMO STATE, NIGERIA.

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ABSTRACT
This study was conducted in Owerri Agricultural Zone of Imo State, Nigeria. A Two stage random sampling technique was used to select 100 farmer cooperators from whom data was obtained using a semi structured questionnaire. Data was analyzed using descriptive statistics, discriminant function analysis and OLS multiple regression model. Results showed that 91.0% of the cooperators were engaged in the production of root and tuber crops, 65.0% and 56.0% were involved in vegetable and grain production respectively. The discriminant function analysis revealed that amount of loan borrowed and education level made the highest positive contribution to the total discriminate score. A total of 62 farmer cooperators belonged to group 1 (credit worthy) while 38 of the farmer cooperators belonged to group 2 (noncredit worthy). The OLS multiple regression estimates showed that educational level, loan size, household size and farm size were positive and significant at varied critical levels, while interest rate was negative and significant at varied critical levels. We recommend that efforts should be made by the government to provide larger loan amounts to farmer cooperatives which would increase the beneficiary farmer's access to basic inputs and improved farm management opportunities and thus lead to higher productivity, reduced per unit cost, higher income and higher repayment of borrowed funds. This can be done by making policies that will improve the linkage between farmer cooperatives and formal credit sources in the area.

Keywords: Credit worthiness, loan repayment, farmers, cooperative societies and credit

INTRODUCTION
Inadequate finance has remained the most limiting problem of agricultural production in Nigeria. Credit is considered as a catalyst that activates other factors of production and makes under-used capacities functional for increased production (Ijere, 1998). Ijaiya *et al.,* (2009) defined credit as financial resources obtained at certain period of time with an obligation to repay at a specified period in accordance with the terms and conditions of the creditor. Although, credit has long been identified as a major input in the development of the agricultural sector (Awotide *et al.,* 2012), lack of access to credit is generally seen as one of the main reasons why farmers in developing economy remain poor, since they tend to perpetuate the vicious cycle of poverty. Farmer cooperative societies play very important roles in the development of Nigerian economy, especially in the provision of cheap credit to farmers. Farmers have two main sources of credit. Credit could be obtained from either the formal sources which are the Commercial banks, Agricultural banks and Government owned institutions, or the informal sources which are the Self-Help Groups (SHGs), money lenders, cooperatives and Non-Government Organizations (NGOs). Due to the relative ease in obtaining credit devoid of administrative delay, non-existence of security or collateral, flexibility built into repayment which differ from what obtains in the formal sources of credit most farmers prefer obtaining loans from informal sources (Aryeetey, 1997).

Farmers are forced to source for capital from relations, money lenders and group contributions, all of these according to Awotide *et al., (*2012) are ineffective in providing enormous capital for substantial increase in agricultural production. The last hope for the farmers lies with the Cooperative Societies (Awotide *et al.,* 2012). Cooperative societies have been identified to be a better channel of credit delivery to farmers in terms of its ability to sustain the loan delivery function (Alufohai, 2006). ICA (1995) defined cooperative society as an autonomous association of persons who unite voluntarily to meet their common economic and social needs and aspiration through a jointly owned and democratically controlled enterprise. The capability of farmers to repay microcredit loans from Cooperatives is an important issue that needs attention; farmers can either repay their loan or choose to default. Borrower defaults may be voluntary or involuntary (Brehanu and Fufa, 2008). Involuntary defaults of borrowed funds could be caused by unexpected circumstances occurring in the borrower's business that affect their ability to repay the loan. Unexpected circumstances include lower business revenue generated, natural disasters and borrower's illness. In contrast, voluntary default is related to morally hazardous behavior by the borrower. In this category, the borrower has the ability to repay the borrowed fund but refuses to, because of the low level of enforcement mechanisms used by the institution (Brehanu and Fufa, 2008). The inability of farmers to repay borrowed fund in accordance with loan terms constitutes a major issue to Cooperative societies.

Lending is a risky enterprise because repayment of loans can seldom be fully guaranteed. Generally, in spite of the importance of loan in agricultural production, its acquisition and repayment are fraught with a number of problems especially in the small holder farming (Awoke, 2004). It is reported in empirical studies (Nwachukwu *et al.,* 2010; Ugbomeh *et al.,* 2008) that large rate of default has been a perennial problem in most agricultural credit schemes organized or supported by governments, institutions and cooperatives. Most of the defaults arose from poor management procedures, loan diversion and unwillingness by farmers to repay loans. Consequently, most farmers are considered credit unworthy by most credit sources and are denied access to their services. This attitude takes hold on the premise that a good number of farmers had in the past diverted loans to unintended ventures and social functions; an impression that has been badly blown beyond its natural proportion (Nwachukwu *et al.,* 2010).

The inability of the farmer borrower to repay borrowed funds in accordance with the loan terms constitutes a major issue to lending bodies. This non-payment in both principal and interest to Cooperatives can result in loan shrinkage, liquidation and ineffectiveness (Onyenucheya and Ukoha, 2007). Lending institutions formal and informal thus, need to consider the characteristics of potential borrowers before loan of any kind is granted. These include economic characteristics, their capacity to make use of additional credit and their personal characteristics. The need to identify the credit worthy and non-credit worthy farmer cooperator and determine factors influencing loan repayment among farmer cooperators necessitated this study. Various studies (Abreham, 2002; Ngwaziem, 2013; Nwachukwu *et al.,* 2010; Onyeagocha, *et al.*, 2012; Ugbomeh *et al.,* 2008) have been done on loan repayment. Other studies (Adebisi, 2007; Ajah *et al*., 2014; Ezeh, 2003; Kohansal and Mansoori, Mbanasor and Nto, 2008) have also been done on credit worthiness but specifically, none of these studies were on credit worthiness and determinants of loan repayment among farmer cooperators. The study intends to: (i) describe socio-economic characteristics of farmer cooperators in Owerri agricultural zone; (ii) identify types of enterprise engaged by farmer cooperators in the study area; (iii) determine credit worthiness of farmer cooperators in the study area and (iv) determine factors influencing loan repayment of farmer cooperators in the study area.

METHODOLOGY
Study Area
The study was conducted in Owerri Agricultural Zone of Imo State, Nigeria. The zone lies between latitudes 5^05^1N and 5^045^1N of the Equator and longitudes 6^045^1E and 7^030^1E of the Greenwich Meridian. The zone shares boundary with Okigwe Agricultural zone to the Northeast, Orlu Agricultural Zone to the North and Rivers State to the South and West. Owerri Agricultural Zone is made up of eleven (11) local Government Areas (LGAs). The population of the area is 1,806,369 persons (NPC, 2006). Owerri Agricultural zone has a land mass of 3000.75km^2 (ISMLSUP, 1999). Agriculture is the predominant occupation of the people; farmers in the zone are mainly small holder farmers growing crops such as cassava, yam, melon, cocoyam, okra, oil palm, vegetables and fruits and raising of poultry, pigs, sheep and goats (Imo ADP, 2000).

Sampling Technique
A Two stage cluster random sampling technique was adopted in this study. A list of registered Cooperative Societies in Imo State was collected from the Cooperative Department of Imo State Ministry of Agriculture. The Cooperatives identified in Owerri Agricultural Zone were grouped into eleven clusters according to the eleven Local Government Areas of the zone. First, four clusters were randomly selected from the eleven clusters, then from each of the four clusters, twenty-five farmer cooperators were randomly selected from the list of Cooperators in each cluster. This gave a total of 100 farmer cooperators for the study.

The study used primary data which was generated through a pretested structured questionnaire that was personally administered. The questionnaire sought information on farmer cooperators' socio-economic characteristics, such as their age, marital status, household size, education level, farm size and other demographic data.

Analytical Technique
Data were analyzed using descriptive statistics such as mean, frequency distribution tables, percentages and inferential statistics such as multiple regression model and discriminant function model. Objectives (i) and (ii) were achieved with the use of mean, frequency distribution tables and percentages. Objective (iii) was realized using discriminant model. Objective (iv) was achieved using Ordinary Least Square (OLS) multiple regression model.

Model Specification
Objective (iii) was a using discriminant analysis; the discriminant analytical model classified the farmer cooperators by the same set of independent equation into two mutually exclusive and exhaustive categories. Using loan repayment values as basis, farmer benefiaciaries were classified into two groups following previous studies (Kleck, 1975; Arene, 1993; Mbanasor and Nto, 2008). Group 1 consisted of farmer cooperators who repaid at least 50% of the loans borrowed, whereas group 2 were farmer cooperators who repaid less than 50% of the loans. Farmers in group 1 were assumed to be relatively credit worthy while those in group 2 were assumed to be relatively non-credit worthy.

The model is presented implicitly as:
$$D_i = b_0 + b_iZ_{ii} + b_2Z_{2i} + \ldots\ldots\ldots\ldots b_8Z_8 \ldots\ldots\ldots\ldots (1)$$
Zi is derived by the formula $Z_i = X_{ij} - X$
Where Z_i = the ith individuals discriminant score of the contribution of each independent variable to the total discriminant score (D_i).
D_i = Total discriminant score
X_{ii} = The ith individual value of the jth independent variable
b_{ij} = The discriminant coefficient for j^{th} variables
X = Mean value of the independent variables
a = Standard deviation of the independent variables

Let each individual score Z_i be a function of the independent variables; that is

$Z_i = b0 + b_iZ_{ii} + b_2Z_{2i}, + \ldots\ldots\ldots\ldots\ldots\ldots b_nZ_{ni} \ldots\ldots\ldots\ldots$ (2)

If Z_i = Zent, classify individual i as belonging to group 1 (Credit worthy farmers) and if Z_i < Zent, classify individual i as belonging to group 2 (Non-credit worthy farmers).

The classification boundary is the locus of points where

$b_0 = b_iZ_{ii} + b_2Z_{2i}, + \ldots\ldots\ldots\ldots\ldots\ldots b_nX_{ni}$ = Zent $\ldots\ldots\ldots$ (3)

The assessment of importance of the derived discriminant function for the study was done using Wilks' Lambda which measures goodness of fit; the group centroids which calculate the cut of score or cutoff point; and the standardized canonical discriminant function coefficient with the associated f-ratio.

The multiple regression model used to realize objective (iv) is implicitly stated below:

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, e) \ldots\ldots\ldots\ldots..$ (4)

Y = Amount of Loan Repaid (₦)
X_1 = Amount of loan borrowed (₦)
X_2 = Age of Cooperators (years)
X_3 = Gender of the farmers (Gender = 1 for female; 0 for male)
X_4 = Education level (Number of years of schooling)
X_5 = Loan size (₦)
X_6 = Marital Status (Married = 1, Otherwise = 0)
X_7 = Household size (Number of persons)
X_8 = Interest rate (%)
X_9 = Farm size (Ha)
ei = Error term

In estimating the regression model four functional forms of the OLS model namely, the linear, semi-logarithmic, double logarithmic and exponential were fitted with the data. The criteria used to choose the functional form with the best fit were magnitude of R^2 Value, magnitude of F-ratio and number of significant variables that conform to *a priori* signs.

RESULTS AND DISCUSSION
Socio Economic Characteristics of the Respondents
Table 1 shows the socio-economic profile of respondents. In relation to gender the table result shows that majority (64.0%) of the farmer cooperators were males while the remaining (36.0%) were females. Similar results had been obtained by Adeyemo and Bamire (2005) among farmer cooperators in south western Nigeria and Sebhatu (2012) among farmer cooperators in Tigrai region of Ethiopia. Many (40.0%) of the farmer cooperators were within the age bracket of 41-50 years, while, 18.0% of them were between 31 and 40 years. The mean age of the farmer cooperators was 44 years. The age of a farmer affects his ability to adopt new innovation and production techniques in agriculture as well as his working capacity (Osondu and Ibezim, 2013).

Information on education level of the respondents is also shown in Table 1. The table indicates that slightly more than half (56.0%) of the respondents had secondary school education and 21.0% had primary school education. Few (15.0%) of the respondents had no formal education. Only 8.0% of the cooperators had tertiary education. The level of education may indicate productivity potential both in on and off farm business (Abdulai and Delgado, 1999; Bime, 2007). Many studies (Bime, 2007; Osondu and Ijioma, 2014) contend that farmer's education influences farm productivity by affecting a farmer's input and output decisions. The number of years of formal education is known to influence the behavior, value, exposure and opportunities of an individual. Education enhances the acquisition and

utilization of information on improved technology by farmers which tend to positively influence productivity (Osondu and Ijioma, 2014).

Table 1 reveals that a good proportion (55.0%) of the farmer cooperators had household sizes of between 5 to 8 persons, while 24.0% and 21.0% of them had 1 to 4 and 9 to 12 persons respectively. The mean household size was 7 persons. This result indicates that the farmer cooperators in the study area had large family sizes. This would have a positive implication on farm family labour supply in the area which could also affect agricultural production. The household size would affect credit demand, use and repayment potential (Bime, 2007).

Table 1: Distribution of Farmer Co-operators Owerri Agricultural Zone of Imo State, Nigeria by socio-economic characteristics

Variables	Frequency	Percentage %
Gender		
Male	64	64.0
Female	36	36.0
Age in years		
21-30	16	16.00
31-40	18	18.00
41-50	40	40.00
51-60	17	17.00
61 and above	9	9.00
Mean 43.865		
Std Dev 21.456		
Educational level		
No formal education	15	15.0
Primary	21	21.0
Secondary	56	56.0
Tertiary	8	8.0
Household size		
1-4	24	24.0
5 – 8	55	55.0
9 – 12	21	21.0
Mean = 7.264		
Std Dev = 4.732		
Farming experience		
1 – 10	13	13.0
11 – 20	24	24.0
21 -30	36	36.0
31 – 40	12	12.0
Above 40	15	15.0
Mean = 24.873		
Std dev = 21.654		
Total	100	100.0

Source: Field Survey, 2014.

In terms of distribution of farmer cooperators by years of farming experience, Table 1 indicates that 36.0% of the farmer cooperators were within the experience year bracket of 21-30. The long years of

experience show the application of skills for effective production and sustainability. Years of experience can also bring about increase in income, which is an added advantage for being credit worthy. The farmer cooperators had a mean of 25 years experience. The more the number of years an individual has been in a particular business, the more he may have gained practical experience to handle the issues of productivity growth (Osondu and Ijioma, 2014).

Enterprise Pattern of farmer Cooperators
The distribution of the farmer cooperators according to enterprise pattern is presented in Table 2. It could be observed that majority (91.0%) of the cooperators are engaged in the production of root and tuber crops which is the main staple food of the people in the area, while 65.0% and 56.0% were involved in vegetable and grain production respectively. However, few 7.0% and 5.0% of the cooperators were mainly involved in piggery and fisheries enterprise respectively. Most dominant livestock enterprise being practiced by fair percentage (21.0%) of the cooperators was poultry. The study found out that most of the cooperators practiced three to four enterprises; in fact no cooperator in the area was solely engaged in one agricultural enterprise. The farmer cooperators in the study area actively engaged in production of a number of commodities unlike the categories that specialized in a particular enterprise. This is in line with Salahu and Oyegbami (2008) who asserted that it is often hard to see a farmer in Nigeria engaged entirely in one particular enterprise. This result indicates that the farmer cooperators in the study area will have enough income through the diversification of production, which will also improve their thrift savings and make them to be credit worthy.

Table 2: Distribution of farmer cooperators by enterprise Dimensions in Owerri Agricultural Zone of Imo State, Nigeria

Age in years	Frequency*	Percentage %
Fruits	24	24.0
Root and tuber (cassava, yam and cocoyam)	91	91.0
Grain (maize)	56	56.0
Poultry	21	21.0
Goat and sheep	11	11.0
Piggery	7	4.0
Vegetable	65	65.0
Fisheries	5	9.0

Source: Field Survey, 2014.
*Multiple responses recorded

Average Statistics of the Discriminant Function Model
The loan beneficiaries were classified into two groups; group 1 consisted of farmer Cooperators who repaid at least 50% of the loans borrowed, whereas group 2 were Famer Cooperators who repaid less than 50% of the loans. Farmers in group 1 are assumed to be relatively credit worthy while those in group 2 are assumed to be relatively non-credit worthy. On this basis, 72 farmer cooperators were found to be relatively credit worthy while the remaining 28 were relatively non-credit worthy. The process of discriminant analysis which predicts a group membership starts with the examination of whether there exist significant differences between groups on each of the independent variables. Nto *et al.,* (2014) opined that if there are no significant group differences, it is not worthwhile proceeding further with the analysis.

Using the group means and Analysis of Variance (ANOVA) as specified in Table 3 which was the group statistics, it could be concluded that there were significant group differences hence making it worthwhile to proceed with further analysis. Important variables could be inferred from the table by inspecting the group means and standard deviation, for instance mean difference between Amount of loan borrowed in group 1 and age of cooperators in group 1 and that of Amount of loan borrowed (group 1) and Amount of loan borrowed (group 2) suggest that these may be good discriminators as the separations are large.

Table 3.0: Group Statistics

Z	Variables	Mean	Std. Deviation	Valid N (list-wise)	
				Un-weighted	Weighted
Group 1	Amount of loan borrowed	831428.5714	445539.25358	72	72.00
	Age	4.8095	1.43541	72	72.00
	Educational level	90690.4762	35430.10164	72	72.00
	Gender	6.7857	4.25146	72	72.00
	Loan diversion/use	298285.7143	316787.47864	72	72.00
	Household size	0.9524	0.21554	72	72.00
	Marital status	13666.6667	196390.18736	72	72.00
	Interest rate	686904.7619	439958.35776	72	72.00
Grou2.	Amount of loan borrowed	282413.7931	124510.41448	28	28.00
	Age	2.9310	1.72558	28	28.00
	Educational level	44982.7586	19529.09784	28	28.00
	Gender	6.0172	4.63204	28	28.00
	Loan diversion/use	83344.8276	75028.31085	28	28.00
	Household size	0.3448	0.47946	28	28.00
	Marital status	4827.5862	14417.50633	28	28.00
	Interest rate	253793.1034	116175.57170	28	28.00
Total	Amount of loan borrowed	513000.0000	406573.51144	100	100.00
	Age	3.7200	1.85363	100	100.00
	Educational level	64180.0000	35405.12432	100	100.00
	Gender	6.3400	4.47037	100	100.00
	Loan diversion/use	173620.0000	237001.80198	100	100.00
	Household size	.6000	0.49237	100	100.00
	Marital status	60200.0000	142722.30577	100	100.00
	Interest rate	435700.0000	366184.26945	100	100.00

Computed from field survey data 2014

Statistical Test of Significance
The statistical test of significance of the determinant estimates is shown in Table 4. The table revealed that the Eigen value of the model was 2.687 which is high. A low Eigen value obtained in the result is an indication of near linear dependencies of the model (Nto and Mbanasor, 2013). The high canonical correlation of 0.792 implied that high significant amount of information required for determining credit worthiness was provided by the function; this also gives an insight to the index of overall model fit and measures the association between the discriminate score and set of independent variables. Table 4 showed that wilks lambda which is the proportion of the total variance in the discriminate score not explained by the differences among groups is 0.372. The low value of the wilks lambda is desirable since only 37.2% of the variance was not explained by group difference. The chi-square statistic of

92.916 was significant at 1.0% probability level at 8 degree of freedom. Hence, it could be concluded that there was a high relationship between the dependent variables and independent variables.

Table 4: Statistical Test of Significance for the discriminate estimates on Farmer Cooperators in Owerri Agricultural Zone of Imo State, Nigeria

Eigen value	2.687
Canonical correlation	0.792
Wilks lambda	0.372
Chi square	92.916
Degree of freedom	8
Significance level	0.000***

Computed from field survey data, 2014
*** Significant at 1% probability level

Assessment of Credit Worthiness among Farmer Cooperators

The linear discriminate function estimates of credit worthiness of farmer cooperators are presented in Table 5.

Table 5: Product contribution of individual variables to the Total Standardized Canonical Discriminant Scores

Variables	Discriminant coefficients	Mean difference	Product Variable Contribution
Amount of loan borrowed	1.048	549014.778	575367.487
Age	0.104	1.8785	0.195364
Education level	0.472	45707.7176	21574.0427
Gender	-0.028	0.7685	-0.021518
Loan diversion/use	-0.360	214940.887	-77378.7193
Household size	0.393	0.6076	0.2387868
Marital status	-0.269	8839.0805	-2377.71265
Interest Rate	-0.113	433111.658	-48941.6174

Computed from field survey data, 2014
Group centroids:
Group 1   1.511
Group 2   -1.094
Cut off point   0.417

The cut-off point for the purpose of classification was taken as the mid-point of total discriminate score for each group. The variables tried in the model were amount of loan borrowed, age, gender, education level, loan diversion / use, household size, marital status and interest rate. The coefficients of the variables might be positive or negative with the view of indicating the direction of the relationship. Amount of loan borrowed, age of cooperators, education level and household size made positive contributions, while gender, loan diversion / use, marital status and interest rate made negative contribution. This suggests that a farmer cooperator borrower's chance of belonging to the group of credit worthy cooperators improves as his amount of loan borrowed, age of cooperators, education level and household size increases. Table 5 reveals that amount of loan borrowed was the strongest determinant of loan repayment potential while education level was next in importance as a predictor. These two variables with large coefficients of 1.048 and 0.472 respectively made the highest

contribution of 575367.487 and 21574.0427 to the total discriminant score. Nwankwo (2004) reported that education level made a high positive contribution to the total discriminant score. This is expected as education enhances the acquisition and utilization of information on improved technology by farmers which tend to positively influence productivity (Osondu *et al.,* 2014). Also, amount of credit at a farmer's disposal determines the purchasing power of the farmer. Such credit if judiciously invested on the farm could increase the net profit of the farmer and thus, allow for loan repayment. Amount of loan obtained and education level should be given optimum consideration in determining loan applicants' credit worthiness potentials in the area. The table showed that the estimated centroid for group 1 was 1.511 and that for group 2 was -1.094. By implication, any variable score that is closer to 1.511 suggests influence on credit worthiness. The cut-off point (0.417) used for purposes of classification was taken as the midpoint of total discriminant score for each of the groups because discriminant function model assumes equal cost of misclassification (Arene, 1993).

Classification Performance of the Estimated Discriminant Function
Classification performance of the estimated discriminant function is shown in Table 6. According to the table, the classification performance of the function was predicted using a sample of 100 farmer cooperators. The power of the model lays in it capability to classify correctly, the higher the classification rate, the better the predictive power of the function. The result in Table 6 shows that out of the 100 farmer cooperators, 69 which constitute 95.83% were classified as credit worthy contrary to the initial classification which saw 72 cooperators to be relatively credit worthy based on the use of repayment rate. The proportion of respondents in group 2 erroneously classified as being in group 1 was 4.17% of the 72 known credit worthy farmer cooperators that belonged to group 1. This kind of misclassification error may cause serious problem in formulating policy targets and constitutes the greatest risk in agricultural credit administration. The 4.17% non-credit worthy cooperators classified as credit worthy may default in the repayment of interest as well as the principal loans. The classification performance of the function which is 92.56% was considered adequate when compared with 93.68% obtained by Ezeh (2003), thus making the identified variables adequate and reliable for policy formulation.

Table 6: Classification Performance of the Estimated Discriminant Function

Actual group	Number of cases	Predicted Group membership	
		1	2
Group 1 (credit worthy)	72	69 (95.83%)	3 (4.17%)
Group 2 (non-credit worthy)	28	3 (10.71%)	25 (89.29%)

Source: Field Survey, 2014.
Percentage of actual grouped cases correctly classified = 92.56%

Determinants of Loan Repayment among Farmer Cooperators
Estimates of ordinary least square (OLS) multiple regression model on factors hypothesized to influence loan repayment of farmer cooperators in Owerri Agricultural zone, Imo State, Nigeria, is shown in Table 7. The F-ratio of all the functional forms (linear, exponential, semi-log and double log) of the regression model were statistically significant at 1.0% probability level implying that any of the functional forms is adequate in estimating and explaining the variations in the amount of loan repaid by farmer cooperators in the study area. The equation of amount of loan repaid was best estimated and explained using double logarithmic functional form which explained 81.30% of the total variation in the explained variable. Other statistical and econometric considerations such as the number of significant coefficients and their conformity to a *priori* expectations were in favour of double

logarithmic functional form. The F-statistic value of 14.35 is statistically significant at 1.0 alpha level, suggesting a good fit of the model.

Table 7: Determinants of Loan repayment among Farmer Cooperators in Owerri Agricultural Zone

Variable	Functional forms			
	Linear	Exponential	Double log+	Semi log
Constant	129136	10.22384	3.1e+07***	2526717***
	(1.51)	(19.69)	(2.63)	(2.67)
Amount of loan borrowed	-92.91013	-0.034940	-2834.27	-926.1824
	(-0.04)	(2.31)	(-0.30)	(1.26)
Age of cooperators	-59514.18	-0.069418	62560.09	-55045.36
	(-1.23)	(-2.24)	(0.16)	(1.50)
Gender of the cooperators	-5066.518	0.0492903**	-568.6693	-74.089
	(-1.46)	(2.35)	(0.16)	(-0.29)
Educational level	305.1329	0.0201978	14437.87***	1061.991**
	(-1.46)	(0.82)	(2.75)	(2.53)
Loan size	-22073.1***	-0.0904920*	55.635*	37.57294**
	(2.73)	(-1.85)	(1.57)	(1.79)
Marital status	-0953675	1.21e-06	-5933.329	-163.0368
	(-0.27)	(0.56)	(1.22)	(1.13)
Household size	33.02786***	0.0002293***	0.017206**	-1964.873**
	(3.99)	(4.56)	(2.23)	(2.29)
Interest Rate	-4.079551	-0.000026	-3967.61**	-618.5671***
	(-1.08)	(-1.13)	(-2.55)	(-3.79)
Farm size	-4.079551	0.3565219**	6992.152*	524.2051
	(-1.08)	(2.15)	(1.88)	(1.90)
R square (R^2)	0.5480	0.3619	0.8130	0.6349
Adjusted	0.4989	0.2918	0.7564	0.5202
F – ratio	11.51***	5.16***	14.35***	5.56***

Source: Field survey, 2014.
***, **, * is statistically significant at 1.0%, 5.0% and 10.0% risk levels respectively.
Figures in parentheses are the t-ratios
+ = Lead equation

The coefficient of educational level (14437.87) had a significant and positive impact on loan repayment of farmer cooperators. This coefficient was significant at 1.0% alpha level and inferred that an increase in education level led to increase in amount of loan repaid by the farmer cooperators. This agrees with a *priori* expectation. Ajah et al., (2014) obtained a similar result. According to them literate farmers repay more of the loans obtained than illiterate ones, having acquired better skill knowledge of farming and understood the advantages of prompt loan repayment (Ajah, *et al.,* 2014). Table 7 also revealed a strong positive and significant relationship between loan size with a coefficient of 55.635 and amount of loan repaid at 10.0% alpha level. This implies increase in loan repayment as the loan size increase. Larger loan sizes would enhance the beneficiary farmer's access to basic inputs and improved farm management opportunities, which would lead to higher productivity, reduced per unit cost and increased income. The investment would be able to pay back itself and consequently support the farmer to repay the borrowed fund within the specified period. Similar positive influence of loan size on repayment performance had been previously reported in separate studies (Afolabi, 2010; Ajah *et al.,*

2014; Kohansal and Mansoori, 2009; Roslan and Karim, 2009; Oladeebo and Oladdebo, 2008; Onyeagocha, *et al.,* 2012). According to Onyeagocha *et al*., (2012) a second perspective to this variable was the larger the loan, the higher is the borrower's cost of delaying payment. A larger loan is more difficult to repay if allowed to accumulate especially where there are compounding interest and sanctions (Onyeagocha, *et al.,* 2012).

The coefficient of household size (0.017206) was positive and significant at 5.0% level. The positive sign of this coefficient implies that as household size of the farmer cooperators increased, the amount of loan repaid also increased. The results from this study therefore revealed existence of positive influence of household size on repayment capacity. The posture of this finding could have resulted from the fact that some members of the households were contributing economically to the household purse. This result was corroborated by Afolabi (2008) who found a positive relationship between family size and loan repayment and attributed it to the respondent's extensive utilization of family labour in the farming activities. However, the result refutes Njoku and Odii, (1991) assertion that farmers with large household sizes are more likely to default in loan repayment as larger household sizes entail spending more of the received loan on financing consumption and other basic household requirements than using it on farm production.

Table 7 also showed that the coefficient of interest rate (-3967.61) was negative and statistically significant at 5.0% alpha level. This result is in agreement with a *priori* expectation. The result implies that the lower the interest rate the higher the amount of loan repaid. Farmer cooperators would find it relatively easier to pay back the principal on loan and interest rate if the interest charged is low. The coefficient of farm size (6992.152) had a significant positive impact on capacity to repay loan by farmer cooperators. This coefficient was significant at 10.0% alpha level and inferred that an increase in farm size led to increase in amount of loan repaid by the farmer cooperators. This result conforms to a *priori* expectation and corroborates Afolabi (2008) who also arrived at similar conclusion in his study of loan repayments among small scale farmers in Oyo State of Nigeria. The implication was that as sizes of farmers' farm holdings increased, they became more inclined toward commercialization and more likely to adopt improved technologies and farm management systems (Ojiako and Ogbukwa, 2012). This would lead to increase in their levels of efficiency and profitability and by extension capacity to repay the borrowed fund.

CONCLUSION
The study found out that the main determinants of credit worthiness among farmer cooperators in the area were amount of loan borrowed and education level and that 4.17% of the cooperators that had been classified as credit worthy were statistically not credit worthy, thus, highlighting the risk in cooperative lending activities. The study further revealed that educational level, loan size, farm size and household size were significant positive determinants of loan repayment among the farmer cooperators, while interest charge was the only significant independent variable that negatively influenced the farmer cooperators capacity to repay borrowed funds. Efforts should be made by the government to provide larger loan amounts to farmer cooperatives which would enhance the beneficiary farmer's access to basic inputs and improved farm management opportunities and thus lead to higher productivity, reduced per unit cost, higher income and higher repayment of borrowed funds. This can be done by making policies that will improve the linkage between farmer cooperatives and formal credit sources in the area. To facilitate effective credit use, farmer cooperatives should put more emphasis on credit management training programs to assist the cooperators manage their loans more efficiently. Farmer cooperatives should consider granting loans to farmers with high educational levels if higher percentage of repayment is to be achieved.

REFERENCES

Abdulai, A. and Delgado, C.L. (1999). Determinants of nonfarm earnings of farm based husbands and wives in Northern Ghana. *American Journal of Economics,* 81(1): 117-130.

Abreham G. (2002). Loan Repayment and its Determinants in Small Scale Enterprises Financing in Ethiopia: Case of Private Borrowers around Zeway Area. A Thesis Submitted to the School of Graduate Studies of Addis Ababa University.

Adebisi M. V. (2007). Appraisal of Credit Worthiness of small scale Farmers in Bosso Local Government Area of Niger State. A B.Tech Agric project Department of Agricultural Economics And Extension Technology, Federal University of Technology, Minna, Niger State.

Adeyemo R., Bamire A.S. (2005). Saving and Investment Patterns of Cooperative Farmers in South western Nigeria. *Journal of Social Sciences,* 11 (3): 183-192.

Afolabi, J.A. (2010). Analysis of Loan Repayment among Small Scale Farmers in South Western Nigeria: A Discriminant Approach. *Journal of Social Sciences,* 17(1): 83-88.

Afolabi, J. (2008). Analysis of Loan Repayment among Small Scale Farmers in South Western Nigeria: A Discriminant Approach, *Journal of Social Sciences,* 17(1): 83-88.

Ajah, E.A. Eyo, E.O. and Ofem, U.I. (2014). Analysis of Credit Worthiness and Loan Repayment among Bank of Agriculture Loan Beneficiaries (Poultry farmers) in Cross River state, Nigeria. *International journal of Livestock production,* 5 (9): 155-164.

Alufohai, G.O. (2006). Sustainability of Farm Credit delivery by Cooperatives and NGO's in Edo and Delta State, Nigeria *Educational Research and Reviews,* 1(8): 262-266.

Arene, C.J. (1993). An Analysis of loan Repayment Potentials of Small Holder Soya Bean Group Farmers in Nigeria. *Quarterly Journal of International Agriculture,* 32:160- 169.

Aryeetey, T. (1997). Rural Financial in Africa: Institutional Developments and Access for the poor. In: M Bruno, B Pleskovic (Eds) Programme of the Annual World Bank Conference on Development Economics. Washington DC.

Awotide, D.O., Aihonsu, J.O.Y., and Adekoya A.H. (2012). Cooperative societies' effectiveness in credit delivery for agricultural enterprises in Ogun State, Southwest Nigeria. *Asian Journal of Business and Management sciences,* 2(3): 74-79.

Bime M.W (2007). Savings Mobilization and Rural Credit Markets Performance in North West Province, Cameroun. A Ph.D Thesis Micheal Okpara University of Agriculture, Nigeria. Pp 1-150.

Brehanu, A., and Fufa, B. (2008). Repayment rate of loans from semi-formal financial institutions among small-scale farmers in Ethiopia: Two-limit Tobit analysis. *The Journal of Socio-Economics,* 37:2221-2230.

Ezeh C.I, (2003) Credit worthiness and determinants of loan repayment of small holder farmers in Abia State, Nigeria, *Nigerian Journal of Sustainable Tropical Agriculture Research*, 5:10-13.

Ijaiya, M.A. Abdulraheem A., and Bello A.T. (2009). Agricultural credit Guarantee Scheme and Food Security in Nigeria. *Journal of International Economic Review* 2(1-2): 167-176.

Ijere, M.O. (1998). Agricultural Credit and Economic Development. In: Ijere M.O. and Okories A. (eds), Reading in Agricultural Finance, Longman, Lagos, pp 4-9.

Imo State Agricultural Development Programme (Imo ADP) (2000). Work Programme. Imo ADP. Owerri , Imo State.

Imo State Ministry of Land Survey and Urban Planning (ISMLSUP) (1999). Area of Imo State by LGA, Government Printer, Owerri.

International Cooperative Alliance (ICA) (1995): Review of International Cooperatives, 4:85 – 86.

Klecka, W. R. (1975). "*Discriminant Analysis in Statistical package for the social sciences*" In Nie, N.H., Hull, C. H., Senkins, J. G. Steinbrenner, K., Bent, D. H. (eds) New York: mcgraw – Hill: 434 – 467.

Kohansal M.R., Mansoori H. (2009). Factors affecting loan Repayment Performance of Farmers in Khorasan-Razavi Province of Iran. Paper presented at the Conference on International Research on Food Security, Natural Resource Management and Rural Development, University of Hamburg, October 6-8, 2009.

Mbanasor, J.A. and Nto, P.O.O (2008). Discriminant Analysis of Livestock Farmers Credit Worthiness Potentials under Rural Banking Scheme in Abia State, Nigeria. *The Nigerian Agricultural Journal,* 39 (12): 1-7.

National Population Commission (NPC) (2006). Provisional Census figures, Abuja, Nigeria.

Ngwaziem, G.C. (2013). Rural Credit Supply and Loan Repayment Performance in Informal Financial Sectors in Abia State, Nigeria. A.B. Agricultural Project Report. Department of Agricultural Economics and Extension Abia State University, Uturu.

Njoku, J.E and Odii, M.A.C (1991). Determinants of Loan Repayment Under the Special Emergency Loan Scheme (SEALS) in Nigeria: A case Study of Imo State "African *Review of Money, Finance and Banking* 1:39-52.

Nto, P.O.O., Nto, C. P. O. and Mbanasor, J.A. (2014). Socio-economic Determinants of the Adoption of Electronic banking in Abia State of Nigeria. *British Journal of Applied Science and Technology* 4 (7): 1089-1099.

Nto, P.O.O and Mbanasor, J.A. (2013). Analysis of Gender Differentials in Economic Opportunities in Abia State of Nigeria. *Review of Social Studies, Law and Psychology.* 7(1): 38-48.

Nwachukwu, I.N. C.S. Alamba, and A. Oko-Isu (2010). Determinants of institutional credit repayment performance among farmers in Afikpo North LGA of Ebonyi State, Nigeria. *Advances in Agriculture and botanics-International journal of the bioflux society,* 2(3): 279-284.

Nwankwo, U. M. (2004). Impact of Community Banks on Women Farmers Poverty Level in Rural Abia State Nigeria. M.Sc Thesis, Department of Agricultural Economics, Abia State University, Uturu.

Ojiako, I.A., and Ogbukwa, C.B. (2012). Economic analysis of loan repayment capacity of small holder cooperative farmers in Yewa North Local Government Area of Ogun State, Nigeria. *African Journal of Agricultural research* Vol. 7(13): 2051 2062.

Oladeebo, J.O., and Oladeebo O.E. (2008). Determinant of Loan Repayment among Smallholder Farmers in Ogbomoso agricultural zone of Oyo State, Nigeria. *Journal of social science, 17(1)*:59-62.

Onyeagocha, S. U. O., Chidebelu, S.A N. D. and Okorji, E. C. (2012). Determinants of Repayment of Loan Beneficiaries of Micro Finance Institutions in Southeast States of Nigeria. *International Journal of Agricultural Management and Development, 2 (3): 167-175.*

Onyenucheya, F., and Ukoha, O. (2007). Loan Repayment and Credit Worthiness of Farmers under the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB). *Agricultural Journal, 2(2): 265-270.*

Osondu C.K. and Ibezim, G.M.C. (2013). Determinants of Rural-Urban Migration and its Effect on Rural Farm Labour Availability in Umuahia North Local Government Area of Abia State, Nigeria. Researcfh Webpub Vol. 1(3): Pp. 29-35.

Osondu, C.K. and Ijioma, J.C. (2014). Analysis of Profitability and production Determinants of Fish farming in Abia State, Nigeria. *World journal of Agricultural science.* 13 (4).

Roslan, A.H. and Karim M.Z.A., (2009). Determinants of microcredit repayment alleviation. World Bank Policy Research Working Paper. No. 1593.

Salahu, B.F., and Oyegbami, A. (2008). Agricultural Production among Cooperative and non-cooperative Farmers revisited in Oyo State, Nigeria. *Journal of Sustainable Development.* 5(12): 37-43.

Sebhatu, K.T. (2012). Saving Behaviour and Determinants of Saving Mobilization by Rural Financial co-operator in Tigrai Region, Ethiopia *journal of Agribusiness and Rural Development.* 4(26): 129-146.

Ugbomeh, G.M.M, Achoja, F.O. Ideh, V. and Ofuoku, A.O (2008). Determinant of Loan Repayment Performance among women Self Help Groups in Bayelsa State, Nigeria. *Agriculture conspectus Scientifics.* 73 (3): 189-195.