This study was designed to analyze agricultural credit risks and defaults management by banks in Imo State. Data were collected with the use of structured and validated questionnaire from 12 purposively selected bank branches and 72 randomly selected farmer loan beneficiaries in the state. Data were analyzed using means, percentages, frequency distribution and ordinary least square regression model. The standard deviations determined for riskiness of agricultural credit to farmers in the three zones (Owerri, Okigwe and Orlu zones) of Imo State were found to be N187,928.93, N146,586.56 and N154,805.41 respectively. Results of the regression analysis show that the related variables; supervision, viability, collateral, sanction, appraisal, and insurance are significant credit and default management techniques employed by banks in the study area in their course of lending to agriculture. It is therefore recommended that banks should put in place a comprehensive credit risk management process to identify measure, monitor and control credit risk and all material risks and where appropriate, hold capital against these risks to reduce risk of delinquencies and defaults, proper education of farmers on loan acquisition and application demands for appropriate collateral and enforcement of loan repayment obligations, recruitment of well trained and motivated staff are necessary precautions for effective credit delivery to the agricultural sector.
INTRODUCTION

In Nigeria, agricultural credit is necessary to enable the farmers take advantage of new technologies in the form of farm machinery, pay for such items as improved varieties of seeds and livestock, fertilizers, pesticides, labour and other running costs. It is in the realization of the fact that credit is a critical factor in agricultural development that for most governments in the developing countries, the channeling of bank lending to agriculture has increasingly become an important policy instrument for increasing agricultural output particularly among the rural poor (Egbe, 1990).

One of the major objectives of the local, state and Federal Government has been that of credit provision and efficient management of agricultural credit. This objective was considered necessary by taking into recognition the important role banks play in the supply of funds to farmers for increased agricultural production. The commitment to prudent lending to agricultural sector is an important and crucial issue in the global banking sector today. Banking prudence and efficiency to manage risks in different business cycle and environment would help to alleviate financial loses and crises faced by the Nigerian banks. Credit risk and default management is an essential component of a comprehensive and effective method to risk management and crucial to the long-term success of financial institutions.

Traditionally, the primary risk for financial institutions has been credit risk and default or the potential for loss which results from lending to the agricultural sector. Institutions accept credit risk and default in order to earn revenue. They will also lend to firms with a higher risk because of the potential for higher returns. Over the last few decades, companies have expanded rapidly both nationally and globally, markets have developed, new and complex products have been created and the client base of firms has increased. This has led to greater opportunities for revenue growth as well as new and increased market and credit risks that need to be identified, assessed and controlled. As a result, new ways are continually being developed to offset these risks.

More recently, government adopted business consolidation strategies viz. mergers, acquisitions and take over in the banking industry to facilitate and strengthen the ability of banks in financing agriculture and other sector of the economy. This according to the Governor of central Bank of Nigeria (CBN), was to among other things “make Nigerian banks to compete favorably in the global financial markets” and to generate high capital base that will provide banks with the resources to meet the cost of compliance in the areas of credit and market risk management (Soludo, 2005).

Credit risk and default management has become a complex subject and its mitigation to acceptable levels is a major concern for all financial institutions. Efforts are being made by management of the banking industry to reduce the risk exposure of banks in lending to borrowers generally, but especially to the agricultural sector which is traditionally prone to credit risks and defaults. Studies have shown that the main cause of the banking crisis in the recent times was poor credit risk management practices typified by high levels of insider loans, speculative lending, and high concentration of credit in certain sectors among other issues. The issue of credit risk and default management became crucial since October 1988 when the Basel committee on banking supervision introduced the “Capital Accord” agreement which traced bank credit risk to capital, it noted that debt capital is a risky instrument for financing bank operations and as such should be discouraged as much as possible. The committee also introduced the “New Capital Accord” which is to be implemented in 2007. This requires that capital charges should be made for credit default, market and operation risks which are aimed at protecting depositors, consumers and the general public against losses arising from banking fragility and failure (Umoh, 2005). Ever since 1988 captains of the Nigeria banking industry have shown keen interest in improving credit risks and defaults management capacity of firms in the banking sector, which resulted in the formation of an organization named Credit Risk Association of Nigeria (CRAN) by risk managers in Lagos. The idea behind this step is to offer them opportunities for networking on issues of credit risks and defaults management in agricultural bank lending.

The failure to effectively manage credit risk created similar problems in counties such as Mexico and Venezuela. In Nigerian, lending institutions are concerned about risk associated with defaults. High levels of default, in many cases above 50%, have been recorded by lending institutions as such Nigerian banks are traditionally reluctant in financing agricultural firms because of credit risks, defaults and high costs of loan administration (Sanderatne, 1986). This has led to the adoption of several measures by government to encourage the flow of bank credit to farmers. Beginning with the 1972 fiscal year, the CBN used credit guidelines to prescribe the size of credit allocation by banks to preferred sectors of the economy particularly agriculture. Also the CBN, through its monetary policy circulars, directed banks to lend a specified minimum percentage of their loan to agricultural production. Failure to comply attracted a penalty in the form of the amount in default being given interest-free to the Nigerian Agricultural and cooperative Bank (CBN, 1998). With effect from 1985, the CBN started stipulating grace period for agricultural loans, which ranged from one year for loans for staple crop production to seven years for livestock in 1980, whereby interest-charged on credit to farmers was kept between the minimum Rediscount Rate (MRR) of the CBN. The Nigerian Agricultural Insurance Corporation (NAIC), Rural Banking Scheme (RBS), and the
Agricultural Credit Guarantee Scheme (ACGS) were other measures used by government to promote bank lending to farmers (Nnanna, 2005).

However, following economic reforms lending rates have been deregulated since 1987. Mandatory credit allocation to agriculture was abolished on October 1, 1996. Consequently, the volume of bank lending to agricultural sector has shrinking. In more recent times, the Federal Government introduced a new agricultural credit scheme in March 2006. The scheme involves a tax waiver on interest earned by banks on loans to agricultural sector and reduction of interest rate to farmers through government subsidy. It was reported that “the tax relief was based on the agreement by stakeholders that interest rates on agricultural loans be reduced in return for government suspension of tax on such facilities. With interest rate for agricultural loan current put at 14%, CBN has also undertaken to subsidize the payment of the 14% by 6%, which in effect, brings the interest farmers will pay on such loans to 80% (CBN, 2006).

The recent emphasis on credit risks and defaults management cannot be fully understood without an understanding of the analysis of credit risks and defaults management in agricultural bank lending, particularly in the study area where most of the rural farmers are being provided with funds by banks to boost agricultural production. This is the major reason why the study focuses on the analysis of agricultural credit risks and defaults management by banks in Imo State.

Therefore, an understanding of the risks and defaults associated with agricultural credit to farmers by banks will help in enhancing the performance and effectiveness of banks in credit risk and defaults management. This will encourage farmers on the procurement and efficient use of borrowed fund as well as the willingness and capacity to repay the loan as at when due and this will increase the flow of funds to the agricultural sector for the actualization of increased agricultural production in the State.

Theoretical Framework

Credit Risk and Default Risk

Credit risk is “the risk of loss caused by the failure of a counterparty to meet its obligations.” In other words, it refers to the delinquency and default by borrowers, i.e. failure to make payment as at when due or non-payment by those owing the firm. Credit risk affects any firm to which money is owed by way of loan debt or obligation to pay, such as fees. In its general form, risk refers to variability around an expected value. The probabilities of occurrence of the different outcomes are known, some of which are loss desirable than others and may entail a loss. Credit risk and default exists in any contract where one party has an obligation to another, and is present in the trading of all financial instruments.

The need to include delinquency derives from the importance usually attached to the time value of money in financial analysis: one naira received today is worth more than one naira received in the future. While delinquencies indicate delay in payment, default denotes non-payment, and the former, if unchecked, leads to the latter (Padmanabhan, 1998). The exposure to credit risk is particularly large for financial institutions like banks which continually expose them to losses and bankruptcy unless they have excellent risk management practices and/or is financially supported by the government. Some of the risks that the banks encounter are, *inter alia*: operational risks, market risks, credit risks, and inadequacy of capital. These interrelated banking risks are faced by all commercial banks, agricultural banks and governmental banks. They may be created as a result of inadequate fund allocation, weak labour regulations, mismanagement, an unsuitable operating environment, weak training programmes, bad credit transactions and price fluctuations.

When firms borrow money, they in turn expose lenders to credit risk. As a consequence, borrowing exposes the firms’ owners to the risk that the firm will be unable to pay its debt and thus be forced into bankruptcy, and the firm generally will have to pay more to borrow money because of credit risk (Harrington and Niehaus, 1999). Non-payment of loans has several undesirable consequences. It reduces the business value of the bank that granted the loan and destabilized the credit system. When defaulters are big farmers, the system becomes unjust as they are subsidized by small farmers who repay promptly. Costs of overdue loans tend to be very high and defaults push up lending costs without any corresponding increase in loan turnover. Default reduces the resource base for further lending, weaken staff morale and affect the borrower’s confidence (Padmanabhan, 1998; Agu, 1998).

The deterioration of the financial conditions in agriculture has been the topic of news report and research efforts for some time. Farmers and agribusinesses are facing increased uncertainties as well as the lending institutions. The revenue uncertainties are caused by low and unstable commodity prices. Evaluating portfolio of agricultural loans has become a vital issue in recent times due to the large number of farm failures and loan default among farmers borrowers, and as a consequence, banks failure.

Risk Measurement in Agriculture

It is said if you cannot measure credit risk, then you cannot manage risk (Monetary Authority Singapore, 2003). Until and unless risks are assessed and measured, it will not be possible to control risks. Further a true assessment of risk gives management of banks a clear view of institution’s standing and helps in deciding future action plan. To adequately capture institutions risk exposure, risk measurement should represent aggregate exposure of institution; both risk type and business line
and encompass short run as well as long run impact on institution.

The measurement of credit risk is of paramount importance in credit risk management. Davies and Kearns (1992) emphasizes that institutions should have procedures for measuring their overall exposure to credit risk as well as exposure to connected parties, products, customers and economic sectors. Bhatia (2005) emphasizes that a well structured Internal Risk Rating system facilitates determination of the obligor’s risk profile and likely loan loss. Internal risk rating is an important tool for monitoring and controlling risk inherent in individual and portfolio credits of a bank or a business line.

Anything that has random outcome where some of the outcomes are preferred to others is risky. Thus, risk is the probability of adverse outcomes associated with our action or decision. Risk is measured using two statistical tools. Variance and standard deviation, both of which are computed using the expected value of the outcomes. Expected value (Ev), i.e. the sum of the probabilities that different outcomes will occur multiplied by the resulting payoffs (Grinols, 1994; Baya, 2000). Formally, if the possible outcomes of the random variable are \(X_1, X_2, \ldots, X_n\), and the corresponding probabilities of the outcomes are \(P_1, P_2, \ldots, P_n\), then the expected value is given by:

\[
Ev = P_1 X_1 + P_2 X_2 + \ldots + P_n X_n \quad \text{equation (1)}
\]

Where \(P_1 + P_2 + \ldots + P_n = 1\)

The variance of a set of random numbers is computed by squaring their deviations from the expected values, multiplying each by the probability and then summing the outcome (Grinols, 1994). Formally, if the possible outcomes of the random variable are \(X_1, X_2, \ldots, X_n\), and the corresponding probabilities of the outcomes are \(P_1, P_2, \ldots, P_n\) and the expected value of \(X\) is given by \(Ev\), the variance (\(\sigma^2\)) is computed as follows:

\[
\sigma^2 = P_1 (X_1 - Ev)^2 + P_2 (X_2 - Ev)^2 + \ldots + P_n (X_n - Ev)^2 \quad \text{equation (2)}
\]

\[
\Sigma = P_i (X_i - Ev)^2
\]

On the other hand, standard deviation (\(\sigma\)) of a set of random numbers is the square root of their variance. It measures variability around an expected value, the amount by which a group of numbers is above or below its expected value. Standard deviation is computed as follows:

\[
\sigma = \sqrt{\sigma^2} = \sqrt{P_1 (X_1 - Ev)^2 + P_2 (X_2 - Ev)^2 + \ldots + P_n (X_n - Ev)^2} \quad \text{equa.} \ldots (3)
\]

\[
= \sqrt{\Sigma P_i (X_i - Ev)^2}
\]

Notice that the quantities in parenthesis measure the deviation of each outcome from the expected value. This difference is squared so that positive differences do not offset negative differences. Each squared difference is then multiplied by the probability of the particular outcomes; so those outcomes that are more likely to occur receive greater weight in the final sum than those outcomes that have a low probability of occurrence (Harrington and Niehaus, 1999). In comparing investment alternatives, the investment with a higher standard deviation is considered riskier than one with a lower standard deviation. If the standard deviation of an investment is zero, it means it is a non-risky investment with a sure outcome. An investment with a zero expected value also have a zero variance and zero standard deviation; implying non-risky investment. Although variance and standard deviation are not synonymous with risk, they are reasonably good summary measures of the degree of variability,
emphasizing the large deviation that most investors want to avoid (Grinols, 1994).

**METHODOLOGY**

The study was conducted in Imo State which is one of the five states of southeastern Nigeria. It covers an area of 5100.10 square Kilometers. Imo State is divided into three agricultural Zones namely Owerri, Orlu and Okigwe agricultural zones. According to the 2006 population census, the population of the state is 3,934,899 persons (NPC, 2006). The rainfall distribution pattern and the tropical equatorial climate of the area give rise to two distinct seasons namely; rainy seasons from March to September and dry seasons from October to February. The vegetable of the area is characterized by thick forest. The climate and rainfall distribution pattern makes the area suitable for agricultural production. The population is predominantly farmers who engage themselves in the rearing of livestock’s and cultivation of crops. Apart from farming, some people also engage in other works such as civil service, teaching, trading and artisan.

The multi-stage sampling techniques were used to select the sample. Imo state was stratified into the existing three agricultural zones. In stage one, four LGAs were purposively selected from each agricultural zone, making a total of 12 LGAs. In stage two, the list of banks in the 12 LGAs were collected from the Owerri office of Central Bank of Nigeria (CBN). From this list 12 bank branches were purposively selected based on having highest number of farmers’ that benefited from their credit schemes and in stage three, the list of farmers that obtained credit from each of the banks was collected from the credit officers in the various bank branches. Proportionate random sampling technique was used to select 72 farmer loan beneficiaries, which is given as;

\[
n_h = \frac{N_h (n_i)}{N}
\]

Where:  
- \( n_h \) = Sample size selected from each bank  
- \( N_h \) = Total Number of farmer loan beneficiaries in each bank  
- \( n \) = Sample size of farmer loan beneficiaries selected  
- \( N \) = Total number of farmer loan beneficiaries in the 12 banks.

**Method of Data Analysis**

Data gathered from the study area were analyzed in accordance with the set objectives. The riskiness of credit supply to farmers by banks was analyzed using the standard deviation method and is expressed as:

\[
\sigma = \sqrt{\frac{P_1 (X_1 - Ev)^2 + P_2 (X_2 - Ev)^2 + \ldots + P_n (X_n - Ev)^2}{\sum P_i (X_i - Ev)^2}}
\]

Standard deviation = \( \sqrt{\frac{\sigma^2}{ \sum P_i (X_i - Ev)^2}} \)

In analyzing the agricultural credit risks and loan defaults management techniques by banks, the ordinary least square regression model was used to analyze credit supply and the credit risk and default management technique used by banks in the cause of their lending to farmers. The model is thus express implicitly as follows;

\[
Y = f (X_1, X_2, X_3,\ldots, X_7, e)
\]

Where \( Y \) = Amount of credit supplied to farmers (Naira)  
- \( X_1 \) = Credit supervision and monitoring of project (No of visits by credit officers in a month)  
- \( X_2 \) = Viability of project (Dummy variable 1 for viable, 0 for otherwise)  
- \( X_3 \) = Type of collateral (Measured on a 5 point scale of TPG (Third Party Guarantee) (1), savingsdeposit (2)household property (3), share certificate (4), and landed property (5)  
- \( X_4 \) = Enforcement of sanctions against defaulters (Dummy Variable 1 = (Yes, No = O)  
- \( X_5 \) = Loan appraisal 1 = (Yes, No = O)  
- \( X_6 \) = Appropriate repayment schedule (anticipated income or profit of the borrower in Naira)  
- \( X_7 \) = Agricultural Insurance (Dummy variable, 1 if there is insurance policy, zero if otherwise)  
- \( e \) = The error term.

It is expected a priori that the coefficients of \( X_1, X_2, X_3, X_4, X_5, X_6, X_7 > 0 \). Four functional forms of the regression model were tried namely; Linear, Semi-log, exponential and cob-Douglas function. The form that gives the best
fit based on the $R^2$ and consistency with the a priori expectation was selected for the analysis (Olayemi, 1998).

RESULTS AND DISCUSSION

**Riskiness of Credit Supply By Banks in Imo State**

The riskiness of credit supply by banks was determined using the standard deviation, and the results for the three agricultural zones of Imo state are presented in Table 1.0.

![Table 1.0: Riskiness of Credit Supply by Banks in Imo State.](image)

Table 1.0 shows that the standard deviations determined for Owerri, Okigwe and Orlu zones were N187,928.93, N146,586.56 and N154,805.41 respectively, which implies that credit supply by banks in Imo state is a risky investment since none of the standard deviations was found to be zero. However, the risk levels are not too high and with proper application of risk management techniques available to the banks will reduce the risk level and hence increase banks’ lending to agriculture.

**Relationship between Credit Supplied and Credit Risks and Default Management Techniques**

The relationship between the amount of credit supplied and the credit risk and default management techniques was estimated using four functional forms namely: semi-log, double log, linear and exponential functions. The double-log function was selected as the lead equation based on having the highest coefficient of multiple determinations ($R^2$), highest number of significant variables and conformity to a prior expectation. Table 2.0 shows the result of the four functional forms.

![Table 2.0: Regression Estimates on Relationship between Credit Supply and Credit Risk and Default Management Techniques.](image)

**Figures in parenthesis are t – ratios**

**= Significant at 1%
* = Significant at 5%
Source: Field survey data, 2008.
The F-value was 22.68 which is significant at 1% level implying that the double-log function gave a good fit to the data. Therefore the results of the double-log function were used for discussion.

The results show that supervision ($X_1$) as a management strategy has a positive coefficient with the credit supplied and it is statistically significant at 1% indicating that an increase in supervision results to increase in credit supplied. The variable viability ($X_2$) also has a positive coefficient and it is statistically significant at 1% level. This indicates that the viability of a project leads to increase in amount of credit supplied to the project. Furthermore, the variables collateral ($X_3$), sanctions ($X_4$), appraisal ($X_5$), and insurance ($X_7$) have a direct relationship with the amount of credit supplied respectively, and they are also significant at 1% level of significance. This indicates that an increase in the magnitude of these variables result to an increase in the amount of credit supplied to the farmers respectively. On the other hand, the repayment capacity ($X_6$) has an expected positive sign but it is not significant at 5% level. This result implies that repayment capacity is not used by banks as a credit risk management technique. This result therefore implies that supervision ($X_1$), viability ($X_2$), collateral ($X_3$), sanctions ($X_4$), appraisal ($X_5$), and insurance ($X_7$) are important credit risk and management techniques employed by banks in their credit supply to farmers in Imo State.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Credit supply by banks to farmers in Imo State was observed to be a risky investment since none of the standard deviations was found to be zero. However, with proper application of credit risk and default management techniques such as supervision, viability, collateral, sanctions, proper appraisal of loan and insurance banks are likely to reduce both risks and defaults associated with agricultural lending, hence increase banks’ lending to agriculture in the study area.

It is worthy to note therefore that sound lending is an act not a science and the success of the systems depends critically upon a positive risk management culture, which without data gathered in the screening process that are guided by well-articulated policies, responsible evaluation and disbursement of loans to agriculture will be virtually impossible.

Recommendations

The findings of this study, recommends amongst others;

i. Banks should put in place a comprehensive credit risk management process to identify measure, monitor and control credit risk and all material risks and where appropriate, hold capital against these risks to reduce risk of delinquencies and defaults.

ii. Establishment of a comprehensive credit risk management system in banks should be a prerequisite as it contributes to the overall risk management system of the bank and recruit well trained and motivated staff as they are the cutting edge of rural credit programs.

iii. There should be strict enforcement of loan repayment obligations by credit officers. Farmers should understand terms and conditions of the loans, disbursement phases and repayment schedules, and should be reminded a month before commencement of repayment.

iv. Proper education of the borrowers, particularly the farmers is necessary for the farmers to learn to use credit for productivity and development in order to enhance timely repayment and create bright conditions for future loans.

v. Banks should not be mere disbursement windows. Prospective borrowers should be farmers with other business links with the bank such as owners of current or deposit accounts.

REFERENCES


