RISK MANAGEMENT STRATEGIES OF BANK OF AGRICULTURE

BORROWERS IN IMO STATE, NIGERIA.

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Abstract

This study was carried out because of the inability of farmers in the area to effectively manage the re-occurring risk associated with agricultural production as revealed by the high rate of default on loans to farmers by the Bank of Agriculture (BoA). The research was designed to examine the risk management strategies adopted by farmers who were loan beneficiaries of (BoA) located at No.1 Tetlow Road Owerri, Imo State Nigeria. Primary data used for the study were collected by distributing 61 questionnaires in total, 60 to farmers and 1 to Bank of Agriculture; No. 1 Tetlow Road Owerri, Imo State Nigeria. Data were analyzed using descriptive statistics, and an ordinary least square regression model (OLS) which was used to obtain the default rate on loans to the farmers. The average default rate estimated on loans to farmers was 49.5%. This shows that the risk management strategies employed by BoA in lending to farmers were poor. The result of this research further revealed that; the majority of the farmers (58.33%) were males. The average age and household size were 48 years and 4 persons respectively. The major risks faced by the farmers were related to either human resources, marketing, or production (H+M+P), which was about 31.67% for both male and female farmers. The poultry farm was more vulnerable to risk than every other enterprise of the farmers under investigation, with about 31.67% vulnerability to risk. The enterprise of the farmer with the least vulnerability to risk was water-leaf farms, which had about a 1.67% chance of risk occurrence. The result of the regression analysis indicates that: loan default (dependent variable) was negatively related to interest rate, Age, Experience, and Household size (Independent variables) at a 5% level of significance. The findings of this research suggest that BoA may consider these factors when evaluating loan applications to farmers to minimize the risk

of loan default. However, it's essential to consider other factors and nuances in the data to make informed lending decisions.

1.0 Introduction

Financial institutions have documented a high percentage of default more than 50% in many cases and as a result, Nigerian banks have historically been hesitant to finance agricultural firms due to the credit risks involved, the possibility of default, and the high cost of loan administration (Banerjee, & Duflo, 2007). To earn more revenue, institutions still take on credit risk and experience defaults. They will also lend to higher risk-prone agricultural businesses since the potential profits might be greater (Kambali & Panakaje 2022). Because agricultural production carries a high level of risk, the majority of Nigerian banks have declined to lend to the sector. (Udoka, Mbat & Duke, 2016). Therefore, risk management is essential to a financial institution's long-term success (Muvunga, 2019). These risks are posed by the environment and farmers, which makes it difficult for them to get loans from financial institutions (Saqib, S., Ahmad, M. M., Panezai, S., & Ali, U. 2016). Bank of Agriculture (BoA), is therefore interested in suitable and reliable risk management solutions in lending to farmers (Akerele, E. O., & Ayodele, J. O. 2018). Given that the agricultural sector is by its very nature a risk-prone venture and that a wide range of uncontrollable factors may have an impact on output pricing and productivity, giving farm households a highly unpredictable economic return (Kahan, D. 2013). It is on this note that farmers and lenders seek to avoid agricultural production related, through different risk management Strategies. Due to the significant risk involved in lending to the agriculture industry, several scholars have suggested that commercial banks should avoid doing so. (Ullar, 2007; Ague et al., 2009; Mishra and Lete, 2005). Despite these concerns, lenders' reluctance to fund the agricultural industry persists because of the projected expansion in the global population (Guja, M. M. 2022). In further research to discover the various sources of risk affecting farmers, (Komarek, A. M., De Pinto, A., & Smith, V. H. 2020), stated the various risk sources include; price volatility, market failures, draughts, pests disease   attacks,   and   irregular   rainfall.

Furthermore, Komarek, A. M., De Pinto, A., & Smith, V. H. (2020), discovered that generally speaking, price risk and market failure were the main sources of risk that farmers faced. This was based on an empirical investigation of Dutch cattle producers. Zhang et al. (2007) separated the agricultural hazards into two categories: covariate (systematic) risk factors and idiosyncratic risk factors. According to him, covariate risks are those that impact a certain geographic region or a group of households, whereas idiosyncratic risks affect individuals or households and include things like family member disease or death. Most significantly, Aditto, S., Gan, C., & Nartea, G. V. (2012) further categorized these difficulties faced by rural farmers into seven categories: risk associated with production, marketing, finances, legality, human resources, economy, and government. Therefore, risk management must significantly rise for agricultural financing to thrive, as agricultural lending cannot be the main form of loan until strong risk transfer strategies are more widely used, (Wenner, Navajas, Trivelli, & Tarazona 2007). Risk management for farmers and agribusinesses is making decisions on how to lessen risks' impact on the farm, which in turn affects the welfare position of the farm, (Misra and Lence 2010). Other researchers view risk management as the practice of recognizing and containing risks to a company's assets and profits. Numerous factors, such as unforeseen financial circumstances, legal obligations, poor

strategic management, mishaps, and natural catastrophes, might pose a danger or cause risk (Sadgrove, 2016). To reduce, monitor, and control the likelihood and/or effects of unfortunate occurrences, risk management is important. This involves identifying, evaluating, and prioritizing risks and then applying measures in a coordinated and cost-effective manner (Kahan, 2023). On the contrary, farmers in developing countries lack access to modern instruments of risk management – such as agricultural insurance, future contracts, guarantee funds, and ex-post-emergency government assistance (Wenner, 2010). These farmers use a variety of "traditional" coping mechanisms and risk-reduction tactics, most of which are ineffective (Boansi et al 2023). Recognizing your comfort level with risk is one method of managing it. Enhance your present marketing abilities and pick up new ones. Create a strategy for integrated management. The following three risk management techniques were taken into consideration for this study: Risk mitigation: this is the process of reducing the likelihood of an undesirable event, danger, or connected calamity. Risk transfer: This is the process of shifting the possible financial ramifications of a certain risk from one party to another. Risk coping: This is the process of strengthening one's ability to endure and manage disasters by preparing ahead of time and utilizing both official and informal channels to maintain livelihoods and output in the wake of a disaster (Yodmani, 2001).

2.0 Material and Methods

This study was carried out at the BoA branch, located at No. 1 Tetlow Road Owerri, Imo State Nigeria; due to their participation in loan services to farmers and other industries within the state and for their challenges in managing risks related to agricultural lending.

The study was carried out by distributing 61 questionnaires in total, 60 to farmers and 1 to Bank of Agriculture to learn how these parties manage the risk inherent in agriculture and the vulnerability to their loan capital.

2.1 Sample Selection

Simple random sampling techniques were used in the selection of 60 farmers consisting of Males and Females who were loan beneficiaries of the Bank of Agriculture Owerri, using their records that reveal the amount received by farmers from 2013 to 2015, the amount repaid as of when due, outstanding amount and the agreed interest rate for the loan, including the repayment schedule, and their rates of default.

The list of farmers that borrowed between 2013 -2015 constituted the sample frame. The list was made of 70 number of male farmers and 40 number of female farmers. From the list, 60 farmers were sampled based on the gender of the individual farmer.

2.2 Data Collection

Data were collected from primary groups. The primary sources were the structured questionnaires administered to both farmers and BoA Bank officials, supplemented with oral discussions.

2.3 Data Analysis

Objectives i, ii, iv, and v, were analyzed using descriptive statistical tools such as the mean, frequency distributions, and percentages, while objective iii, was determined using the OLS Regression Technique.

2.4 Specification Model

In the default rate and determinants of loan default on BoA loans, the ordinary least square regression model was used to analyze the default rate on BoA loans. The model is thus express implicitly as follows; $Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, e)$

Where Y = loan default (Naira)

X_1 = Age of farmer (years)

X_2 = Level of education (no. of years spent in school)

X_3 = Enterprise type (dummy variable, 1=crop, 0=livestock)

X_4 = Farming experience (no. of years in farming)

X_5 = Farm size (ha)

X_6 = Household size (no of persons)

X_7 = yearly income (naira)

X_8 = Agricultural Insurance (Dummy variable, 1 if there is an insurance policy, zero if otherwise)

Marital status (Dummy variable; 1for married and 0 for single)

X_9 = Interest paid (naira)

X_{10} = Management strategy adopted (measured on a 3point scale; 1 for mitigation, 2 for transfer, and 3 for the avoidance of risk)

X_{11}=Risk exposure (dummy variable, 1 for yes, 0 for no).

e = the error term. It is expected a priori that the coefficients of $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11} > 0$.

Four functional forms of the regression model were tried namely; Linear, Semi-log, exponential, and Cob-Douglas functions. The form that gave the best fit based on the R^2 and consistency with the a priori expectation was selected for the analysis (Lorlamen and Ogah 2021)

The explicit form of the model is expressed as

Linear Form:
$Y = bo + b_1X + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + e$

The double log functional form:
$LogY = Logb_0 + b_1logX_1 + b_2logX_2 + b_3logX_3 + b_4logX_4 + b_5logX_5 + b_6logX_6 + b_7logX_7 + b_8log X_8 + b_9logX_9 + b10logX_{10} + e$

The semi-log functional form:
$Y = logb_o + b_{11}ogX_1 + b_2logX_2 + b_3logX_3 + b_4logX_4 + b_5logX_5 + b_6logX_6 + b7logX7 + b_8logX_8 + b_9logX_9 + b_{10}logX_{10} + e$

The exponential form:
$LogY = b_o + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + e$
Where b_0 =intercept

X and Y= as already identified

b_1 - b_{10} =regression coefficient

4.0 RESULT AND DISCUSSIONS

The result of the analyses performed with the data collected was presented in this section. The socio-economic characteristics of the farmers were analyzed and the result is presented as shown below in Table 1.

4.1 Socio-Economic Characteristics of the Respondents:

Table 1: Age of the Respondents.

Age	Male Frequency	Percentage	Female Frequency	Percentage	Pooled Frequency	Percentage
30 – 39	4	11.42	1	4	5	4
40 – 49	16	45.71	17	68	33	68
50 – 59	13	37.14	5	20	18	20
60 – 69	2	5.71	2	8	4	8
70 – 79	0	0	0	0	0	0
Total	35	**100**	25	**100**	60	**100**
Mean	**48**		**49**		**48**	

Source: Field Survey data, 2017.

The result from Table1 above shows the age of Male and Female households which is important in risk management. It was observed that in the male headed households, that 45.71% or 16 persons fall within the age bracket ranging from 40 – 49 years. The survey also shows this class interval to be the modal class as it has the highest frequency. This means that farming activities were usually performed by young men due to the fact that the distribution of men between 40-49years appears to be the highest amongst other frequency distributions.

The mean age of the male headed household was found to be 48 years. This mean that majority of my respondents were young farmers. Also, in relation to the female households,

68% or 17 persons were between the ages of 40 – 49 years which is the modal age. This means that the majority of my respondents still practice farming activities between the ages of 40 - 49 years. The mean age of the female-headed household was observed to be 48 years. These findings agree with that of (Devi, Gupta, & Verma, 2020), who disclosed that farmers of 45 – 55 years old were also observed in his research work.

Table 2: Sex Distribution of the Respondents

Gender	Frequency	Percentage
Male	35	58.33
Female	25	41.67
Total	**60**	**100**

Source: Field survey data, 2017.

The result in Table 2 shows that 58.33% of male and 41.67% of female respondents respectively were into farm activities in the area. This therefore means that both male and female counterparts were into farm work at every season of farm work in order to increase food supply so as to ensure food security and increase income which will improve their standard of living.

Table 3: Marital Status of the Respondents

Marital status	Male		Female		Pooled	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Single	1	2.86	9	36	10	16.67
Married	31	88.57	10	36	41	68.33
Widowed	3	8.57	6	28	9	15
Total	**35**	**100**	**25**	**100**	**60**	**100**

Source: Field Survey, 2017

Table 3 above shows that the majority of farm activities were done by married people in the area and there would be an increase in farm production because resources would be minimal to waste, particularly on non-economic activities in the area. This applies that farm activities were done mostly by married people in the study area. (Babu, Glendenning, Okyere, & Govindarajan, 2012), confirms this in their work where they observed that 92.6% of the farmers were all married.

Table 4: Household Size of Male and Female Respondents

Household size	Male		Female		Pooled	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1-2	5	14.29	9	36	14	23.34
3-4	13	37.14	4	16	17	28.33
5-6	12	34.29	6	24	18	30
7-8	3	8.57	6	24	9	15
9-10	2	5.71	0	0	2	3.33
Total	**35**	**100**	**25**	**100**	**60**	**100**

Source: Field survey, 2017.

Table 4 above shows the distribution of household size. It shows that the modal class of house size of 37.14% and 36% were male and female respectively in the range of 3 - 4 and 1 - 2 respectively. Generally, the male and female farmers in the area had household sizes of at least 4 persons (on average). This implies that the household size of the farmers is likely to be contributing to farm activities as family labour. This will help enhance farm productivity and in turn, improve their food security.

Table 5: Level of Education of the Respondents

Level of Education	Male		Female		Pooled	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Non- formal	6	17.15	4	16	10	16.67
Primary	17	48.57	9	36	26	43.34
Secondary	9	25.71	7	28	16	26.66
Tertiary	3	8.57	5	20	8	13.33
Total	**35**	**100**	**25**	**100**	**60**	**100**

Source: Field survey, 2017.

The level of education of the farmers as shown in table 5 above was to find out the educational

Number of visits	Male		Female		Pooled	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
0	27	77.14	20	80	47	78.33
1	5	14.29	2	8	7	11.67
2	3	8.57	3	12	6	10
3	0	100	0	0	0	0
Total	**35**	**100**	**25**	**100**	**60**	**100**

level of the respondents in the area. This shows that the modal class of educational attainment of both the male and female respondents in the study area were 48.57% and 36% respectively. This means that a higher percentage of the respondents attended primary school; 25.71% and 28% attended secondary school while only 8.57% and 20% attended tertiary institutions. In general, this shows that farmers in the area had basic education, and therefore could adapt to changes in technology, and make wise decisions relating to farming, to profitably exploit opportunities in the marketplace. This is in line with the work of (Chikaire, Ani, Nnadi, & Godson-Ibeji, 2015) who observed that most of the farmers had basic education.

Table 6: Farming Experience of the Respondents

Farm Experience (years)	Male		Female		Pooled	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1-2	19	54.29	15	60	34	56.67
3-4	9	25.71	3	12	12	20
5-6	5	14.29	3	12	8	13.33
7-8	2	5.71	4	16	6	10
Total	35	100	25	100	60	100
Mean	2		4.5		3.5	

Source: Field survey, 2017

Table 6 shows the distribution of respondents according to their level of experience. It shows that 54.29% of males have their modal class between 1-2 years of farming experience and 60% of females have their modal class between the ages of 1-2 years. The male and female in the area had little experience in their farming business. In general, the Male and Female farmers in the area had at least 3 years of experience. This experience level is relatively low and that could be the reason for the high rate of default on BoA loans 4.7 Extension visit of the Respondents

Table 7: shows the number of visits by the extension agent.

Source Field survey, 2017

Table 7 above shows the number of visits by extension agents to the farmers in the area. From the above table, the modal class for the male shows that 77.14% of the male farmers did not receive an extension visit. Also, 80% of the Female households did not receive extension visits. This will therefore affect the output of crops and livestock; and will in turn affect the loan repayment performance of the male and female farmers respectively.

Table 8: Primary occupation of the Respondents
Source: field survey, 2017

Nature of risk	Male		Female		Pooled	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
E+G	2	5.71	1	4	3	5 (8)
H	1	2.85	2	8	3	5 (9)
M	2	5.71	3	12	5	8.33 (5)
E+G+M	3	8.57	0	0	3	5 (7)
H+M	2	5.71	1	4	3	5 (10)
P	4	11.42	5	20	9	15 (2)
E+P	2	5.71	3	12	5	8.33 (4)
H+P	3	8.57	1	4	4	6.67 (6)
E+M+P	4	11.42	2	8	6	10 (3)
H+M+P	12	34.29	7	28	19	31.67 (1)

From the above table 8, 74.29% of the male households were farmers, 8.57% were civil servants, and 8.57% were traders. None was a Craft man, while 8.57% were into other kinds of occupation in addition to farming. This means that the majority of the male households were devoted farmers. This could help give accurate information since the research was targeted at farmers. However,

Occupation	Male		Female		Pooled	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Farming	26	74.29	16	64	42	70
Civil Servant	3	8.57	2	8	5	8.33
Trading	3	8.57	4	16	7	11.67
Artisan	0	0	1	4	1	1.67
Others	3	8.57	2	8	5	8.33
Total	35	100	100	100	60	100

the remaining percentage of the people were in other occupations in addition to farming. This could also give a wider view of the research work. This is in agreement with the research of Rigg, Salamanca, Phongsiri, & Sripun, (2018). Farmers are usually more abundant in rural communities than in any other occupation.

Table 9: Nature of Risk faced by Male and Female Farmers
Source: Field survey data, 2017.

*Multiple responses were recorded

*E = Economic risk, G = Government risk, M =Marketing risk, P = Production risk and H = Human resource risk. (Saqib, Ahmad, Panezai & Rana, 2016).

Table 9 shows that majority of the farmers in the area were faced with Human Resource Risk + Marketing + Production (H+M+P) risk more than any other type of risk inherent in agricultural production. This implies that good management strategy must accompany agricultural production for the farmers in the area. Also, about 31.67% of both male and female farmers complained that they were faced with risk related to Human resource + Marketing + Production (H+M+P) risk in their farming activities. This is in line with Aminu, Balogun, & Oke, (2019). It showed that the main production hazards that farmers faced were pests, illnesses, and unpredictable weather. The farmers' main personal risk was poor health (69.2%), while their main commercial risk was low crop prices (92.5%). 86.7% of the primary financial risks were related to insurance.

This could be because of their inability to sell their goods on time, and the perishable nature of their products which make them sell them at distressed prices thus reducing their profit margin. About 10% of the farmers were faced with human resource + Marketing risk. This could be because of the health challenges suffered by the farmers and also as a result of their inability to

Enterprise Exposed	Male		Female		Pooled	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Cassava	3	8.57	2	8	5	8.33
Maize	4	11.43	5	20	9	15
Cucumber	2	5.71	0	0	2	3.33
Pumpkin	4	11.43	2	8	6	10
Poultry	9	25.72	10	40	19	31.67
Fishery	6	17.14	5	20	11	18.33
Plantain	2	5.71	1	4	3	5
Piggery	4	11.43	0	0	4	6.67
Water leaf	1	2.86	0	1	1	1.67
Total	**35**		**25**	**100**	**60**	**100**

properly market their products. About 8.33% face Economic + Price risk, and Marketing risk each, respectively. This could be a result of their inability to properly manage the income they realized or poor marketing strategy. About 6.67% of the farmers complained of Health + production risk. This could be because of the unpredictable nature of agricultural practices and the illness faced by farmers during peak production season. About 5% complained of Marketing risk (M), Economic + Government + Marketing risk (E+G+M), Human resource risk (H), Human resource + Marketing risk (H+M) and Economic + Government risk (E+G) respectively. Finally, about 15% of the farmers complained of production risk. This could be a result of unfavorable weather conditions, drought, pests, and diseases that affected their farm enterprise.

Table 10: Enterprise of the Farmer Exposed to Risk
 Source: Field survey data, 2017

Table 10 above shows the various farm enterprises of the respondents under study that were more vulnerable to risk than the others. From the table above, it was observed that the majority of poultry farmers face more risk in their poultry business than water-leaf farmers. This is because poultry production has about a 31.67% chance of risk occurrence or risk exposure, while water leaf had the lowest chance of risk incidence of about 1.67%. In general, livestock farming showed higher risk probabilities than crop farming. This result disagreed with the work of Bell, Moore, & Thomas, (2021) which revealed that; based on the conditional value at risk, the cattle enterprise had lower downside risk than the cropping operations across all sites.

Table11: Management Strategies adopted by farmers who were loan beneficiaries of BoA
Source: Field Survey data, 2017

Table 11 above shows the various ways by which farmers manage the risks associated with agriculture. From the table, it was observed that the modal class of the Male household is 57.14% and the mean strategy was just risk coping. This therefore means that the majority of the farmers in Male households in the area adopted Risk Coping as a strategy for managing agricultural risk.

This could be because Men are risk takers and also the need to meet the family's daily demand for food other than for profit. Only about 25.71% of Male households adopted risk mitigation as strategies, this could be because Male households were not good managers. About 5.7% of Male households transferred their risks to third parties in the form of insurance, forward contracting, etc. while only about 11.42% avoided risk in agricultural production.

In the female household, however, the modal class is 'mitigation'. This could be because the female households were better informed on risk management measures to take in their farming business. Also in the female households, about 20% of the farmers coped with the risk, this could be because of the desirability for higher returns. This was in line with Ejike et al, (2013) "that farmers also choose enterprises with higher risk due to the potential for higher return". Also in Female households, 0% of the farmers transferred their risk to third parties in the form of insurance, etc. This could be because the insurance companies in Nigeria were not functioning and as a result of this about 36% of the female households avoided risk in agricultural production. This was in line with Wenner, 2010 that "Agricultural industry is an inherently risky economic activity. A large array of uncontrollable elements can affect output production and prices, resulting in highly variable economics return to farm households".

In general, the only strategy available to farmers in the area was merely coping with the yield uncertainty regarding agricultural production; coupled with the use of good management practices to ensure food security for the rural dwellers.

Table12: Type and Nature of Risk faced by BoA and the Management Techniques Adopted

S/N	Category	Risk factor	Management Techniques			
	Risk of Borrowers default or Non Payment at all	Poor yield, Pest and diseases, Unwillingness to pay, Unfavourable weather, etc.	**RISK Mitigation** Example: Insurance identification of risk comfort level of the lender Use of biometrics for uniquely identifying clients. Review of the credit score history of the borrower. An innovative form of collateral (20% lien). Disbursement of microloan. viability of the project, Etc.			
	Mgt. Strategies	**Male** Frequency Percentage	**Female** Frequency Percentage		**Pooled** Frequency Percentage	
	Mitigation	9 25.71	11 44		20 33.33	
	Coping	20 57.14	20 20		25 41.67	
	Transfer	2 5.7	0 0		2 3.33	
	Avoidance	4 11.42	9 36		13 21.67	
	Poor Creditworthiness of borrowers	Lack of assets (land, equipment etc). Lack of existing fam. Loan diversion, etc.	**RISK AVOIDANCE** Loss of willingness to take the risk.			
	Total	**35 100**	**100 100**		**60 100**	
	Institutional Risk.	Experience level of loan officer, Transfer of staff, death of staff or credit officer, etc.	**RISK COPING** Use of experienced personnel as loan officers, proper training of existing staff, good management, etc.			

Source: field survey data, 2017

Variance form	Linear form	Semi-log form	Double log form	Exponential form (L)
Constant	34.2448 (1.652)	181.6651 (2.065597)	8.323062 (2.686529)	2.992449 (4.461321)
X1 (Age)	0.003618 (0.008476)	-4.0318 (0.22552)	-0.22474 (0.35687)	-0.00221 (0.16006)
X2 (Edu.)	-0.24178 (-0.008476)	-0.06967 (-0.11549)	-0.22474 (-0.2728)	-0.00221 (-0.16006)
X3 (Enterprise)	4.557549 (-0.36558)	4.486758 (3.59648)***	0.170781 (3.886156)***	0.162465 (3.728827)***
X4 (Experience)	-0.24173 (-0.36558)	5.009432 (0.857397)	0.182471 (0.886586)	-0.04059 (-1.5357)
X5 (Farm size)	5.603724 (1.94545)	12.00953 (1.47098)	0.413915 (1.439219)	-0.17009 (-1.82462)*
X6 (House hold size)	0.033368 (0.037036)	-12.0161 (-1.9965)*	-0.29307 (-1.38232)	-0.07645 (-2.62185)**
X7 (Income)	-1.32E-05 (1.03937)	5.77866 (0.78757)	4.52E-07 (1.09976)	-4.52E-07 (-1.09976)
X8 (Insurance)	0.506208 (0.058705)	0.01779 (0.002125)	0.09439 (0.320119)	0.029936 (0.107276)
X9 (Interest)	-0.00255 (-7.07694)	-7.27721 (-1.28371)	-0.81265 (-4.0695)	-4.77E-05 (-4.07692)***
X10 (Mgt. Strategy)	-11.5774 (-1.1103)	-14.0916 (-1.40762)	-0.27357 (-0.77576)	-0.15335 (-0.45442)
X11 (Risk)	20.55517 (0.1749)	15.21385 (1.091426)	0.569233 (1.159256)	0.972446 (2.013217)**
R^2	0.407447	0.397019	0.407446	0.627909
Adjusted R^2	0.271654			0.953843
SE	24.71609	0.258836	0.271652	2.5681
F-Value	3.000493	2.873134	3.000477	3.263888

Table13 Regression Estimates of Default rate and determinants of Loan default.

Source Field survey, 2017.   Figures in parentheses are t – ratios.

***= Significant at 1%

** = Significant at 5%

* = Significant at 10%

L = lead equation

The F-value was 3.26 which is significant at a 1% level implying that the exponential function gave a good fit for the data.

In table 13 above, four functional forms were tried and the choice of the correct functional form was chosen based on some valid criteria. The exponential model was picked as the lead equation

for this regression analysis because it has the highest number of significant variables, the highest R^2, the lowest standard Error of Regression, and lastly, it has the highest F-value.

The result of the table shows that the coefficient of Enterprise type is highly significant at 1% and is positively related to the loan default. The implication of this is that some farm enterprises were more vulnerable to risk than others. This agrees with the work Moreno et al (2021), that the risk involved in the monoculture of crops is usually higher than that involved in mixed farming.

The result of the table above also shows that the coefficient of farm size is significant at 10% and is negatively correlated to the loan default. The implication of this is that as the use of unproductive farmland increases, the risk of default on BoA loans also increases. This is in line with the DAFWA Report, 2017 (Department of Primary Industry and Regional Development) that;

"The main purpose of changes in land use on these unproductive soils is to reduce losses". This also agrees with the work Kassegn, & Endris (2022) which says; that increased use of unproductive farm size could lead to a greater increase in loan default.

The result above shows that the coefficient of household size is significant at a 5% level of significance and is negatively related to loan default. This is in line with Brehanu, & Fufa, (2008), which found that: the larger the family, the higher the consumption and the use of income for non-productive purposes.

The table also shows that the coefficient of interest rate is highly significant at 1% and is positively related to the risk of loan default. This means that as the risk of loan default increases, the interest rate decreases for agriculture loans. This is due to the government's undertaking to reduce the interest rate on loans to agriculture through the provision of subsidies, due to the need to attain self-sufficiency in human food and fiber need. This is in line with CBN Report, 2006 that; "the government has undertaken to subsidize the payment of the 14% by 6%, which will bring the interest that farmers will pay on such loans to 8% ".

The result also shows that the coefficient of risk incidence is significant at 5% and is positively related to the risk of loan default. This means that the more risk the farmer takes without proper risk management techniques, the greater the chances are for default. This is because the more exposed the farm is to risk, the greater the chances of default. This is in line with Wenner, 2010 that; "Agricultural industry is an inherently risky economic activity".

5.0 CONCL1USION

The risk management strategy adopted by BoA in lending to farmers was observed to be poor since the rate of default on BoA loans was estimated to be about 49.5% and the majority of the farmers in the area were faced with either human resource risk, marketing, or production related risks more than any other type of risk inherent in agricultural production. This implies that good management strategies must accompany agricultural production to reduce the default rate to the barest minimum

These findings suggest that lenders may consider these factors when evaluating loan applications to minimize the risk of loan default. Banks should lend only to farm enterprises with lower risk levels to avoid loan default. Banks should also lend to farmers with large household sizes since they serve as a cheap source of labour. Banks should consider the income-generating ability of the proposed farm enterprise before disbursing loans to them. Interest levels on loans should be increased only based on the level of risk involved. Banks should consider their risk comfort level before disbursing loans before agricultural production However, it's essential to consider other factors and nuances in the data to make informed lending decisions.

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