DF-447
[1-6]

RESEARCH ARTICLE Agricultural Science Digest, Volume Issue : ()

Determinants and Preferences of Credit Risk Management in Farming: Evidence from Rice Enterprise in Nigeria

Okpukpara Benjamin, Victoria Okpukpara, Omeje Ejiofor, Ikenna Ukwuaba

10.18805/ag.DF-447

ABSTRACT

Background: This research was conducted in Enugu State. Nigeria is motivated by the fact that small scale rice farmers in Nigeria are faced with severe credit risk. This has increased their instability in productivity and resulted in high loan default. A multiplicity of research in Nigeria has neglected the aspect of credit risk management, especially in crop farming. The study explores the determinants and preferences of credit risk management in rice farming in Nigeria.

Methods: A multi-stage sampling technique was used to select the respondents for the study. Specifically, a random sampling technique was used to select 10 crop farmers from eight selected communities, which gave 80 respondents for the study. However, after data cleaning and other exercises of data editing, 75 questionnaire were collected and used for the analysis. Finally, in the selection of financial institutions, a purposive sampling technique was used to 16 formal financial institutions that had operated for more than ten years in each of the selected local government areas.

Result: The study identified that credit risk management is affected by education, diversification of income sources, farming experience, banking with commercial banks and informal financial institutions, amount of credit and experience in the past credit risks. In addition, the preference of rice farmers to credit risk aversion is appropriate management of production risks, price risks and moratorium risk.

Key words: Credit risk management, Determinants preference, Rice farming.

INTRODUCTION

The contribution of agriculture is an answer to poverty alleviation strategies and food security for many countries. Researchers have identified that Nigerian agriculture is dominated by smallholder crop farmers (Okpukpara, 2021). However, the contribution of small-scale agriculture in Nigeria is limited by many factors. Lack of credit for farming has been singled out as the most critical limiting resource in rural farm enterprise development in Nigeria (Sandstorm, 2009; Okpukpara, 2010; Okpukpara, 2021). Strong seasonal demand for funds characterizes the smallholder agricultural sector in Nigeria and there are also numerous borrowers of these funds scattered over a wide area. The average size of the loan is small and this, coupled with the relatively short repayment period, has resulted in the problems associated with agricultural finance being generally more complicated than in the case of other industries. Thus, the agricultural loan is termed risky. The most significant risks the farmer faces are climatic risks and floods, which destroy the entire crop or part of it (Okpukpara, 2013; Chimkono *et al*., 2016). Other risks are resulting from falling prices due to market dumping and an increase in supply and those from plagues and diseases that strike crops partly or totally destroy them.

In light of the recent economic environment and COVID 19 pandemic, the kinds of services that the various agricultural financial institutions have traditionally provided have also changed. In addition to this response, the structure of production has changed, the economic conditions prevailing in different parts of Nigerian have changed and agricultural products have been affected by fluctuations in credit markets. Given the potential of small scale crop production in the current diversification effort of the Federal Government of Nigeria in their current theme tagged “Green Alternative”, rice production was given priority. Under the programme, one of the significant ways to improve the productivity of agriculture and indeed crop production is to adequately finance all the value chains along the production lines (Ekinci and Poyraz, 2019). Minimizing credit constraints, according to studies is a vital part of solutions to increase crop productivity, enhance competitiveness and facilitate inclusive growth (Adnan *et al*., 2019; Rondhi *et al*., 2020).

More importantly, both inaccessibility and inadequacy of credit are associated with the level of risk inherent in the crop farming business. Despite government interventions and regulations, most financial institutions shy away from

Department of Agricultural Economics, University of Nigeria, Nsukka, Nigeria.

Corresponding Author: Victoria Okpukpara, Centre for Entrepreneurship and Development Research, University of Nigeria, Nsukka, Nigeria. Email: victoria.okpukpara@unn.edu.ng

How to cite this article: Benjamin, O., Okpukpara, V., Ejiofor, O. and Ukwuaba, I. (2022). Determinants and Preferences of Credit Risk Management in Farming: Evidence from Rice Enterprise in Nigeria. Agricultural Science Digest. DOI: 10.18805/ag.DF-447.

Submitted: 08-01-2022 **Accepted:** 06-05-2022 **Online:** 07-06-2022

financing crop enterprises. For instance, the Nigerian government has developed different ways of achieving financial inclusion in agricultural production. The programmes that are specific for agricultural funding are; the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL), Commercial Agriculture Credit Scheme (CACS), Agricultural Credit Guarantee Scheme Fund (ACGSF), Agricultural Credit Support Scheme (ACSS) and Fund for Agricultural Financing (FAFIN) (Ade, Simmonds, Ceuvas, Baldauf, Fissha, Akanisi, Sutherland, Biley, Okpukpara and Fraser, 2016; Rondhi *et al*, 2020). Despite the multiplicities of these programmes, commercial lending for agriculture in Nigeria has remained abysmal lower than the African average of 2.5%. Currently, commercial bank lending to Nigeria's agricultural sector is 2.1% (Okpukpara, 2021, Okpukpara, 2016).

Given the recent financial turbulence in the overall economy, the importance of managing credit risks management becomes a compelling necessity. There are many ways farmers can manage credit risks, including maintaining good financial records, making smart loan decisions, maintaining cash and credit reserves, managing production and marketing risks and securing off-farm employment (Yui, 1997). The lending methodology of formal financial institutions is riskier than those faced by informal financial institutions (Soren, 2002; Tudela and Young, 2002). By utilizing these and other credit risk management tools, a farmer can reduce the risk and develop a more stable and profitable enterprise despite the uncertainties inherent in the agriculture industry (Zidora *et al*., 2016).

The overall effect of risk factors on credit delivery to farmers is high loan delinquency and poor productivity. Consequently, repayment performance is usually used as a proxy for credit risk management variables (McIntosh *et al*., 2013). This study will adopt the same. In addition, the loanable funds in the financial institutions are abysmally low to guarantee extending credit to other farmers and farming activities. Though many different models have been developed by various financial institutions (Bellemare and Bloem, 2018), the effectiveness and efficiency of these models are yet to be examined (Lin, 1997; Adnan *et al*., 2019). Researchers in different risk containing and risk averting models in agriculture were mainly on agricultural production (Zidora *et al*, 2016; Okpukpara, 2021). Little or no attention was paid to specifics in agriculture in terms of types of crop and enterprise. Many studies have recommended further research on a specific risk containing and risk averting for a particular agricultural production in different financial institutions (Bellemare and Bloem, 2018; Adnan, 2019). They believe that financial institutions should use different credit risk management strategies for different types of agricultural production. This is important because risk averting and risk containing models are effective when tailored to a specific type of agricultural production like a crop.

Therefore, given this, it has been observed that there has not been enough information both past and present in the analysis of risk involved in extending credit to small scale crop farmers from small scale farmers' viewpoints. Therefore, investigating this research issue will help identify critical problems associated with the determinants and preferences of credit risk management by smallholder rice farmers in Nigeria and other developing countries.

The interest in Enugu State is that though the small scale farmers in the state had the highest number of applications for funding in financial institutions, the lowest number of loan beneficiaries from financial institutions (Omeje, 2021). In addition, the major agricultural enterprise is dominated by small-scale crop producers, especially rice. Further, the interest in rice is apt because of the government's current interest on the crop. Rice is seen as the three leading food crops of the world and major staple food among households in Sub-Saharan Africa (Okpukpara, 2016). Rice and rice products constitute about 95% of palliatives during COVID 19 relief measures in Nigeria (CDC, 2020). This is attributed to steadily increasing incomes and continued population growth. Demand for rice is expected to continue to increase in the coming years. Enugu state is noted for its hub in rice production. Nigeria can supply only 49% of domestic rice demand (FMARD, 2020). The means that the local production of rice has to increase to match the high disparity between rice demand and supply.

Therefore, the primary motivation for this study is to offer appropriate credit risks management strategies by rice farming and highlight the determinants and preferences of the credit risks in events of rice farmers.

MATERIALS AND METHODS

The research was conducted in Enugu State, Nigeria. The dominant criteria for selecting Enugu State were the prevalence of small scale rice farmers and numerous financial institutions in most of the rural areas in the state. Enugu state is also among the highest rice producing states in Nigeria. In addition, rice production is known to be a major staple and livelihood strategy in the state. The state is made up of 14 core rural local government areas, where rice farming is practised. Enugu State is made up of three agricultural zones, 17 local government areas and 39 Development Centres in the state.

A multi-stage sampling technique was used to select the respondents for the study in the following ways. First, the sample frame for this study was all the small scale rice farmers who applied for credit, whether access or not, from financial institutions in the selected areas formed the sample frame. The list were collected from and with the help of Enugu State Agricultural Development Projects (ENADP). Eight were selected at random out of 14 Local Government Areas (LGAs) located in rural areas. A random sampling technique was used to select two communities from each of the selected rural LGAs, which gives 16 communities. A

random sampling technique was used to select 10 crop farmers from eight selected communities, which gave 80 respondents. However, after data cleaning and other exercises of data editing, 75 questionnaire were collected and used for the analysis. Finally, all the financial institutions in the selected LGAs formed the sampling frame for financial institutions. In selecting financial institutions, a purposive sampling technique was used to 16 formal financial institutions that had operated for more than ten years in each of the selected local government areas. This gave a total of 16 formal financial institutions. Therefore, 75 farmers and 16 financial institutions were used for the study. Relevant primary data were collected through questionnaire, focus group discussions and lead informant interviews. The secondary information were also collected from publications. The major analytical tools used to achieve the study's objectives are descriptive statistics and the Poisson regression model.

Model specification

The Poisson model for count data is suitable for estimating the rice farmers' decisions on managing credit risks. The binomial distribution represents the probability of repaying *k* percentage of credit given *n* independent trials

$$P\ (Y = k) = \binom{n}{k} p^k\ (1\text{-}p)^{n-k} \qquad \ldots(1)$$

where $\binom{n}{k} = \frac{n!}{k!\ (n\text{-}k)!}$ and *p* is the probability of repaying a percentage of credit *k*.

The statistical theory states that a repetition of a series of binomial choices, from the random utility formulation, asymptotically converges to a Poisson distribution as *n* it becomes large and becomes small.

$$\lim_{n\to\infty} \binom{n}{k} p^k\ (1\text{-}p)^{n-k} = \frac{e^{-\lambda}\ \mu^{k}}{k!} \qquad \ldots(2)$$

Where

$p = \mu / n$ and μ is the mean of the distribution, such as the mean percentage of credit repaid by crop farmers per rice farmer. This formulation allows modelling of the probability that a farmer chooses the percentage of credit to be repaid *k* given a parameter μ, the sample mean.

The statistical theory outlined above can be modelled into a series of discrete farmer decisions that sums across an aggregation of choices to a Poisson distribution. The Poisson regression model is the development of the Poisson distribution presented in equation (2) to a non-linear regression model of the effect of independent variables x_i on a scalar dependent variable y_i. The density function for the Poisson regression is

$$f(y_i / x_i) = \frac{e^{-\mu_i}\ \mu_i^{\ yi}}{y_i!} \qquad \ldots(3)$$

where the mean parameter is the function of the regressors x and a parameter vector β is given by:

$$E(y_i / x_i) = \mu_i = \exp\ (x'_i \beta\ ) \text{ and } y = 0, 1, 2, \ldots\ldots \qquad \ldots(4)$$

where

$$\exp\ (x'_i \beta\ ) = \exp\ (\beta_0\ ) + \exp\ (\beta_1 x_{1i}) + \exp\ (\beta_2 x_{2i}) \ldots + \exp\ (\beta_k x_{ki}) \qquad \ldots(5)$$

Also note that

$$\beta_j = \frac{\partial E(y_i / x_i)\ / \partial x_{ji}}{E(y_i / x_i)} = \frac{\partial\ log\ E(y_i / x_i)}{\partial x_{ji}} \qquad \ldots(6)$$

That is the coefficients of the marginal effects of the Poisson model can be interpreted as the proportionate change in the conditional mean if the j^{th} regressor changes by one unit.

Finally the Poisson model sets the variance to equal to the mean. That is:

$$V(y_i / x_i) = \mu\ (x_i \beta\ ) = \exp\ (x'_i \beta\ ) \qquad \ldots(7)$$

This restriction of the equality of the mean and variance in the Poisson distribution is often not realistic as it has been found that the conditional variance tends to exceed the mean resulting in over-dispersion problem (Winkelmann, 2000). If the over-dispersion problem exists, the conditional mean estimated with a Poisson model is still consistent though the standard errors are biased downwards (Grogger and Carson, 1991). A more generalized model to account for the over-dispersion problem is based on the negative binomial probability distribution expressed as:

$$f(y_i / \mu, \alpha\ ) = \frac{\Gamma(y_i + \alpha^{-1})}{\Gamma(y + 1)\ \Gamma(\alpha^{-1})} \left(\frac{\alpha^{-1}}{\alpha^{-1} + \mu}\right)^{\alpha^{-1}} \left(\frac{\mu}{\alpha^{-1} + \mu}\right)^{y} \qquad \ldots.(8)$$

where

$$\mu_i\ = \exp\ (x'_i \beta\ ) \qquad y = 0, 1, 2, \ldots\ldots \qquad \ldots..(9)$$

and $\alpha \geq 0$ characterizes the degree of over-dispersion, or the degree to which the variance differs from the mean. That is, in the case of the Negative Binomial model employed here:

$$V(y_i / x_i) = \mu_i + \alpha \mu_i^2 \qquad \ldots..(10)$$

Once the negative binomial model is estimated, significant over-dispersion is checked using the alpha coefficient. If the estimated alpha coefficient is zero, then the conditional mean is equal to the conditional variance and the negative binomial model reduces to the Poisson model. If the estimated alpha coefficient is significantly greater than zero, then over-dispersion is present and the estimated negative binomial model is preferable to the Poisson model. An excellent facet of the negative binomial model is that the Poisson model is nested within it (Cameron and Trivedi, 1998).

The independent variables specified as factors influencing farmers' repayment performance as proxied by the percentage of credit to be repaid defined as follows:
X1= Age of the respondent (years).
X2 = Educational level (year of formal education).
X3= Farming experience (years).
X4 = Extension education (Yes= 1, No= 0).
X5 = own off-farm employment (Yes= 1, No=0).
X6 = Past experience with risk (severe = 1, mild = 0).
X7 = Obtain credit from commercial Bank.
X8 = Obtain credit from microfinance Bank.
X9 = Obtain credit from informal Institutions.
X10 = Amount borrowed (in naira).
X11 = Interest on loan (per cent).
Note: Obtain credit from State bank is a base variable for where respondents obtain credit

RESULTS AND DISCUSSION

First, it is important to examine the bank's mitigation measures. The result of the study is grouped into three different bank risk mitigation measures across four financial institutions (informal, microfinance, commercial and state), evaluation of bank risk mitigation measures and determinants of repayment performance. The informal financial institutions hardly accept moveable collateral and the number of tiers of decision making is small. However, they have no provision for bad debt because they impose fines on loan defaulters. Unlike informal institutions, formal institutions requests for immoveable collateral had provisions for bad debts and has increased the number of tiers in making loan decisions. Formal institutions provide capacity building for the borrowers, provides agricultural extension workers to the rice farmers and have risk management departments

Reasons for delayed payment

In terms of rice farmers, as shown in Table 1, 37% of the respondents who had loan repayment problems attributed the problem to natural disasters, while 27% of the respondents attributed the delay to the high cost of production. Further, 19 % of respondents delayed their loan repayment due to family responsibilities. These problems, which make loan repayment difficult, can lead to poor credit history. Credit history is the most important criterion the financial institution uses to determine successful loan applicants. This is suggested by Khan *et al* (2020),

Apart from these, the agricultural sector is exposed to various risks. These include climate and weather risks and diseases. These risks always causes high variability in agricultural enterprise production outcomes. Production risks are exacerbated by price, credit, technological and institutional risks. In addition, other risks increased the credit risk by rice farmers (Table 2). The table shows that the majority of the respondent (47%) reported that the major risk associated with their farming activities is production/ yield risk. This risk is often related to weather (excessive or insufficient rainfall, extreme temperature) and plants and animal diseases. The second major risk reported by respondents is price risk (20%). This is probably attributed to high inputs costs and low cost of output, especially price glut associated with peak harvest without storage facilities. In this event, farmers in production areas sell their products at very low prices because of the supply and demand gap. This finding is related to Hassan and Paltrinieri (2019), Personal risk is perceived as the least important. The result of Focus Group Discussion and Lead Informant Interview on the effect of risks on agricultural enterprise shows that majority reported that risks affected the quality of their produce, the price of output and the quantity of produce. More importantly, the risk factors affected their income, which was the primary source of delay or default in loan repayment. The apparent consequence of this is making rural agricultural entrepreneurs unable to repay the loan, which gives most formal financial institutions low confidence in rural agricultural entrepreneurs' ability to honour loan agreement terms. Similar findings have been reported elsewhere (Lam *et al*., 2022).

Table 1: Distribution of respondents according to problems that delayed repayment of loan.

Problem of repayment	Frequency	Percentage
High cost of production	31	27
Low market price	32	26
Duration of acquisition	38	32
Family responsibilities	23	19
Natural disaster	44	37
Total	168*	>100

* Multiple responses were recorded.
Source: Field Data, 2019.

Table 2: Distribution of respondents according to risk factors.

Risk factors in farm production	Frequency	Percentage
Production/ yield risk	35	47%
Price risk	15	20%
Institutional risk	8	10%
Financial risk	6	8%
Assets risk	8	10%
Personal risk	4	5%
Total	75	100%

Source: Field Data, 2019.

Determinants repayment performance

The result of the determinants of repayment performance of the rice farmers is presented in Table 3. The result shows that education, farming experience engaging in off-farm employment, past experience in credit risk and obtaining a loan from informal financial institutions were positively significant to loan repayment, while getting loan from commercial banks and the amount of loan acquired were negatively influencing repayment. The result is inconsonant

Table 3: Estimation results of Credit Repayment Performance of Rice Famers in Nigeria.

Variables	Coefficient/(SE)
X1= Age of the respondent (years)	0.0176 (0.0237)
X2 = Educational level (year of formal education)	0.0361*** (0.0137)
X3= Farming experience (years)	0.0015** (0.0007)
X4 = Extension education (Yes= 1, No= 0)	0.0307 (0.0297)
X5 = Own off-farm employment (Yes= 1, No=0)	0.0096** (0.0046)
X6 = Past experience with risk (severe = 1, mild = 0)	2.3099*** (0.1702)
X7 = Obtain credit from commercial Bank	-2.4864*** (0.5012)
X8 = Obtain credit from microfinance Bank	0.0895 (0.0734)
X9 = Obtain credit from informal Institutions	-0.0015** (0.0007)
X10 = Amount borrowed (in naira)	-0.0015** (0.0007)
X11 = Interest on loan (percent)	0.0043 (0.0123)
Constant	1.5915*** (0.2447)
Observations	611
Log-likelihood	-979.0981
chi2	70.4866
P	0.0000

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. Source: Computed from Field Survey, 2019.

with a priori expectation because experience gathered during formal education is enough to propel good credit management. In addition, when farmers are educated, there is always a possibility of keeping a good financial record, which enhances good agricultural practices that dovetails to sustainable profit for credit repayment. A similar result has been found elsewhere (Saqib *et al*., 2016). Engaging in off-farm employment also enhances good credit management. For the fact that most of credit moratorium are short and will not be able to guarantee effective credit repayment, farmers have to augment the shortfall from non-farm income resources. The attitude of financial institutions, mainly formal institutions in terms of the repayment period and grace period, encourages repayment difficulty by small scale rice farmers. This informed the negative relationship between loan repayment and banking with commercial banks. Similar result has been found elsewhere Siddique *et al,* 2020.

CONCLUSION

This study concludes that credit risk management is affected by education, diversification of income sources, farming experience, banking with commercial banks and informal financial institutions, amount of credit and experience of the past credit risks. However, banking with commercial banks and the amount of credit negatively influence the repayment of rice farmers in Nigeria. Rice farmers' preference for risk aversion is the appropriate management of production, price and moratorium risks. Therefore, rice farmers should incorporate these variables in their credit risk management. In view of this, private and public credit institutions should design a credit risk management model that incorporates insurance, off taking arrangements for rice farmers and moratorium risk management that consider the peculiarity of small-scale rice farmers in Nigeria. For the small-scale farmers to have access to agricultural credit services, the credit institutions must agree to bear the costs and risks involved in dealing with this group of borrowers, especially when tangible collateral is unavailable. In addition, the government should provide the necessary financial and institutional support to the rice farmers by providing facilities that could enhance good agricultural practices (GAP) These practices are; the provision of required and timely input, access to extension services and appropriate and timely credit among others. This will guarantee a sustainable income that will guarantee repayment.

Conflict of interest: None.

REFERENCES

Adnan, K., Ying, L., Sarker, S., Hafeez, M., Razzaq, A. and Raza, M. (2019). Adoption of contract farming and precautionary savings to manage the catastrophic risk of maize farming: Evidence from Bangladesh. Sustainability. 11(1): 29.

Bellemare, M.F. and Bloem, J.R. (2018). Does contract farming improve welfare? A review. World Development. 112(1): 259-271.

Cameron, C. and Trivedi, P.K. (1998). Regression Analysis of Count Data, Econometric Society Monograph No. 30, Cambridge University Press. 1998.

Nigeria Centre for Disease Control (CDC) (2020). https://ncdc.gov.ng/diseases/sitreps/?cat=14 and name= An%20update%20of%20COVID-19%20outbreak%20in%20NigeriaAccessed 3 December 2021.

Chimkono, E.E., Willy, M. and Agnes, N. (2016). Effect of non-performing loans and other factors on the performance of commercial banks in Malawi. International Journal of Economics, Commerce and Management. 4(2): 549-563.

Ejiofor, E.O., Chukwuemeka (2021). Impact of agricultural protection on agricultural growth in Nigeria: Political economy perspective (1980-2016). Review of Agricultural and Applied Economics (RAAE). 22: 234 -240

Ekinci, R. and Poyraz, G. (2019). The effect of credit risk on financial performance of deposit banks in Turkey. Procedia Computer Science. 158: 979-987.

Federal Ministry of Agriculture and Rural Development (FMARD), (2020). Comprehensive Agricultural Production Across the States. Abuja. FGN

Grogger, J.T. and Carson, R.T. (1991). Models for truncated counts. Journal of Applied Econometrics. 6(3): 225-238.

Hassan, M.K. and Paltrinieri, A. (2019). Liquidity risk, credit risk and stability in Islamic and conventional banks. Research in International Business and Finance. 48: 17-31.

Khan, M.A., Siddique, A. and Sarwar, Z. (2020). Determinants of non-performing loans in the banking sector in developing state. Asian Journal of Accounting Research. 5(1): 135-145. https://doi.org/10.1108/AJAR-10-2019-0080.

Lam, B.T., Cuong, T.H., Hop, H.T.M., Kien, N.T., Lebailly, P. (2022) Value Chain Financing Approach: A Good Way to Sustainable Agricultural Growth in Vietnam. In: Global Changes and Sustainable Development in Asian Emerging Market Economies. [Nguyen A.T., Hens L. (eds)], Vol. 1. Springer. Cham. https://doi.org/10.1007/978-3-030-81435-9_37.

Lin Wei-Yi (1997). The Future Development of Taiwan's Financial Sector, International Commercial Bank of China Monthly. 1997, No. 16 3.

McIntosh, C., Sarris, A., and Papadopoulos, F. (2013). Productivity, credit, risk and the demand for weather index insurance in smallholder agriculture in Ethiopia. Agricultural Economics. 44(4-5): 399-417. doi: 10.1111/agec.12024.

Okpukpara B, Ude, O.C. P., David, K. and Okpukpara, V. (2021). Meta-analysis of value chain financing among small scale rice farming enterprises in Enugu State, Nigeria. IOSR Journal of Agriculture and Veterinary Science. 14(9): Ser. I PP 34-41.

Okpukpara B.C. (2016). Determinants of willingness to pay for biosecurity measures among poultry farmers: A mitigation response to bird flu incidence in Nigeria. Journal of Animal and Plant Sciences. 26(5): 1418-1428.

Okpukpara, B. (2013). Household's financial savings in rural Anambra State, Nigeria: Exploring group determinants in terms of Ability, Willingness and Opportunity to hold savings. International Organization of Scientific Research. (IOSR) Vol. 4 No 1.

Okpukpara, B.C. (2010). Credit constraints and adoption of modern cassava production technologies in rural farming communities of Anambra State, Nigeria. African Journal of Agricultural Research. 5(24): 3379-3386.

Rondhi, M., Aji, J.M.M., Khasan, A.F., Putri, A.T.R. Yanuarti, R. (2020). Risk aversion, risk preference and farmers' decision to participate in broiler contract farming: A case study in Jember, Indonesia. Caraka Tani: Journal of Sustainable Agriculture. 35(1): 98-107.

Sandstorm, A. (2009). Political Risk in Credit Evaluation. World Bank Group.

Saqib, S.E., Ahmad, M.M., Panezai, S. and Ali, U. (2016). Factors influencing farmers' adoption of agricultural credit as a risk management strategy: The case of Pakistan. International Journal of Disaster Risk Reduction. 17: 67-76. doi:10.1016/j.ijdrr. 2016.03.008.

Siddique, A., Masood, O., Javaria, K. and Huy, D.T.N. (2020). A comparative study of performance of commercial banks in ASIAN developing and developed countries. Insights Into Regional Development.

Soren, H. (2002). Household, Group and Programme factors in Group based Agricultural Credit Delinquency. Ripon College USA.

Tudela, M. and Young, G. (2003). A Merton Model Approach to Assessing the Default Risk of UK Public Companies. Bank of England, Mimeo.

Rainer, W. (2000). Econometric Analysis of Count Data Third, Revised and Enlarged Edition. Springer-Verlag Berlin Heidelberg GmbH. Germany.

Zidora, C., Cunha, C.A., Neto, O.J.O., Wander, A.E. (2016). Price risk management strategies in corn marketing in rural Mozambique. Research Journal of Agriculture and Environmental Management. 5(5): 160-171.