ANALYSIS OF CAUSES AND MANAGEMENT OF AGRICULTURAL LOAN DEFAULT BY RURAL BANKS IN THE NORTHERN REGION OF GHANA

By

GABRIEL SELASIE AGBEDOHU

(10637522)

THIS THESIS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF

MPHIL IN AGRIBUSINESS DEGREE

DEPARTMENT OF AGRICULTURAL ECONOMICS AND AGRIBUSINESS,

COLLEGE OF BASIC AND APPLIED SCIENCES UNIVERSITY OF GHANA, LEGON

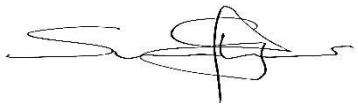
JULY, 2019

DECLARATION

I, Gabriel Selasie Agbedohu, author of this thesis entitled "ANALYSIS OF CAUSES AND MANAGEMENT OF AGRICULTURAL LOAN DEFAULT BY RURAL BANKS IN THE NORTHERN REGION OF GHANA", do hereby declare that except for the references cited, which are duly acknowledged, this thesis is the product of my own research work in the Department of Agricultural Economics and Agribusiness, University of Ghana, from August 2018 to July 2019. This thesis is not published or submitted either in part or whole anywhere for the award of a degree.

GABRIEL SELASIE AGBEDOHU

(10637522)



Signature

22/06/2020

Date

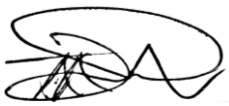
PROF. RAMATU MAHAMA AL-HASSAN
(Major Supervisor)

Signature

22/06/2020

Date

DR. JOHN BAPTIST D. JATOE
(Co-supervisor)



Signature

22/06/2020

Date

DEDICATION

This work is dedicated to my entire family especially my father Mathias Agbodohu, my mothers Ruby Agbedohu and Margaret Antwi also to Elsie, Edem, Peace and Gloria for the sacrifices they made throughout my education.

ACKNOWLEDGEMENTS

I thank God for another milestone in my education, His grace has seen me throughout this period. I would also like to appreciate the efforts and patience of my supervisors Prof. Ramatu Mahama Al-Hassan and Dr John Baptist D. Jatoe in helping put this work together. I would also like to acknowledge the contributions of Dr. Irene S. Egyir (Head of Department) and other senior members of my department to this work. I thank the A.G Leventis Foundation Fellowship for providing financial support for my research work through the Leventis research grant. My profound gratitude goes to all the financial institutions and farmers who helped with the data for this study. Finally, I thank all my friends in Akuafo Hall, University of Ghana for their moral support.

ABSTRACT

Agriculture is important in developing countries because of the role it plays in attaining food security and rural economic stability. Financing the agriculture sector however, has been a challenge because of the sector's exposure to exogenous risk factors, limited collateral of clients and the seasonal nature of agricultural production. As a result of these risks that result in loan default, financial institutions in Ghana allocate a rather small share of their loan portfolios to the sector, compared to other sectors. Given the perception of financial institutions that lending to farmers is risky, the study sought to find out how rural banks manage their lending to reduce loan default. The study was conducted in the Northern region of Ghana and included 5 functioning rural banks and their clients. The logit model and Likert scale procedures were used to identify the causes of loan default from the perspective of borrowers and lenders respectively; rank the causes of default from the perspectives of rural banks with Kendall's W; identify and assess the effectiveness of strategies adopted by banks to mitigate loan default using a Likert scale. Using performance of group loans, the study finds that the size of the group and group executives being educated, have a positive relationship with loan default, whiles farmers engaging in off-farm businesses, years of business relationship between the lender and borrower and monitoring had a negative relationship with loan default. From the perspective of the banks, borrowers diverting the loan for other purposes was the predominant cause of default. A significant degree of agreement was found among the rural banks in the region regarding the causes of loan default. The most adopted and effective credit risk management measure was evaluating the repayment capacity of the borrower. The study recommends that since the rural banks were in agreement on the causes of loan default in the region, a general management strategy will be relevant to the whole region. It is recommended that capacity building workshops should be organised for rural banks and farmer groups on ways to control endogenous causes of agricultural loan default. Also, rural banks should upgrade their management information systems (MIS) to be more analytical to identify characteristics of clients associated with high risk of default.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

BAAC	Bank for Agriculture and Agricultural Cooperatives
BoG	Bank of Ghana
CRM	Credit Risk Management
CWE	Credit with Education
GSS	Ghana Statistical Service
IFC	International Finance Corporation
MoFA	Ministry of Food and Agriculture
NMB	National Microfinance Bank
RCB	Rural and Community Banks
SPSS	Statistical Package for Social Sciences
WRS	Warehouse Receipt System
ZANACO	Zambia National Commercial Bank

CHAPTER 1

INTRODUCTION

1.1 Background

Agricultural lending is a business of providing credit facilities for agricultural purposes. Agricultural loans can be classified as short-term or long-term credit. Short-term credit describes credit with a repayment period between 6-18months; this credit is used for settling operating cost and it is also known as seasonal or production credit. Long-term or investment loans have repayment period beyond 36 months and are usually for purchasing long-term assets or major enterprise expansions. Loans that have repayment period between short-term and long-term loans are classified as mid-term loans (Becerra *et al.*, 2010).

In the context of this study, risk is defined as "the uncertainty of decision-makers with regard to future events that is reflected in incomplete information and can result in economic losses or deviations from a priori fixed target values" (Schaper, Lassen, & Ludwig, 2010, p.3). Default risk in agricultural lending is the risk linked with the inability of a borrower to repay a loan when due (Addae-Korannkye, 2014). Sometimes lending institutions are unable to recover principal and interest when due, as stipulated in the terms and conditions of the loan transactions and this is referred to as loan default (Musima, 2012). Loan default is not an uncommon occurrence in agriculture in developing countries; Maurer (2014) refers to risk in agricultural finance as risk from the financial viewpoint. For financial institutions, an occurrence like this thwarts the achievement of financial stability and sustainability (Afriyie and Akotey, 2013). The global situation of agricultural loan default has been on the increase in countries like Thailand (Nakornthab, & Suwan, 2006), Nigeria (Udoh, 2008) and Kenya (Amwayi, Omete, & Asakania, 2014). Risks in agriculture result in fluctuations in the profitability of agribusinesses and this affects the repayment of loans invested (Maurer, 2014; Singla & Sagar, 2012).

Maurer (2014), reported that agricultural finance has principal, specific and political risks. Principal risks are risks associated with the viability of the farm enterprise and character of farm owner; these characteristics are common in other micro and small non-farm businesses. Maurer identifies the high degree of informality of these enterprises as a source of principal risk: farmers do not appreciate the relevance of record keeping and there is no separation between personal and business activities. Financial institutions are unwilling to lend to agriculture because of exclusive risks like production risk and market risk which are linked to loan default and are known as specific risk (Maurer, 2014; Chao-Béroff, 2014).

The causes of risk in agriculture can be attributed to the high dependence on natural conditions like rainfall, temperature variation, crop diseases as well as volatility in prices owing to changes in market conditions (Singla & Sagar, 2012; Sulewski & Kloczko-Gajewska, 2014). Agriculture is a physical process and depends on natural and biological factors, the emergence of which cannot be predicted. This affects the cash flow and hence repayment of loans. The over-reliance on nature and lack of information on these factors have led to agriculture being a very risky business venture (Klein, Meyer, Hannig, Burnett & Fiebig, 1999). Unsuccessful government credit programmes have instilled a habit of default in borrowers (Klein *et al.*, 1999). Government hand-outs given in the form of loans in the past have negatively influenced the repayment culture of borrowers. This has led to a case of high moral hazard whereby borrowers use loans for riskier endeavours. Clients have little or no collateral to secure loans. Most farmers do not have the kind of collateral financial institutions require and those with collateral do not have it properly documented for it to be used as security to back the request for a loan. Challenges reported by lenders serving the agricultural sector in East Africa include price volatility, climate shocks, adverse government policies, low borrower capacity, high operating cost in the rural areas, lack of agriculture specific terms in loan product and finally low ability of lenders to access the credit-

worthiness of clients (Dalberg, 2018). As a result of all these factors, agriculture is not a preferred sector for lending by financial institutions (Klein *et al.*, 1999).

Despite agriculture being a risk-prone sector, it is one of the major contributors to the economies and employment of many developing countries. The contribution of agriculture to the GDP of some developing countries ranges between 19% and 36% for countries such as Burkina Faso (30.8%), Nigeria (21.2%), Kenya (35.6%), Ghana (19.6%), Tanzania (31.5%), Afghanistan (21.9%), Pakistan (24.6%) (World Bank, 2018). The agricultural sector also provides opportunities to boost the growth of financial institutions, according to a report by International Finance Corporation (2012). Financial institutions can benefit from the increasing global food demand by lending to agriculture. They can play a key role in food security by investing in farming; servicing agriculture can be an avenue for diversifying loan portfolio; by way of investing into climate adaptation technologies, financial institutions can contribute to climate change adaptation with its investments.

Agriculture cannot be deprived of funding because of its importance to economic development and food security (Peck Christen, *et al*., 2005). In the past, agricultural loans were heavily subsidised, supply-led and targeted at a group of beneficiaries until developing countries embarked on financial sector reforms in the 1980s (Peck Christen, *et al*., 2005). The government of Ghana in attempts to extend financial services to rural areas and agriculture, instituted agricultural lending requirement for commercial banks in the 1960s. Commercial banks were supposed to lend at least 20% of their loan portfolio to agriculture. The government also created the Agricultural Development Bank in 1965 to be a principal source of credit for agriculture and other related sectors (Yerby, 1977). The government also supported the formation of Rural and Community Banks in 1976 (Nair & Fissha, 2010). The first Rural bank was established in Nyakrom a farming community in the Central Region with a paid-up capital of 60,660 old Ghana Cedis (6.006 GHC) (Nair & Fisha, 2010). Presently

there are 138 licensed Rural Banks (with about 400 branches) with a Stated Capital of GHC 9 million and Cash and Cash equivalent of GHC 181,225,554 (ARB Apex Bank, 2017). The quality of loan portfolio continues to be a grave concern because of non-performing loans. The Loans and Advances of Rural Banks stand at GHC 29,907,000 with non-performing loan ratio which is a measure of the industry's asset quality increased to 22.7% from 17.3% in 2016 which is the total loan portfolio delinquent (ARB Apex Bank, 2017). Rural banks were mandated to improve lending in rural areas because commercial banks limited their services to the cities (Nair & Fissha, 2010). However, the paradigm shift following reforms of structural adjustment removed restrictions on interest rates and stopped directed credit. The aim of the reforms was to create a competitive and efficient market-place for financial intermediation (Becerra, Fiebig, & Wisniwski, 2010; Chao-Béroff, 2014).

Regardless of the liberalisation of agricultural financial markets, governments still find ways of interfering in agricultural finance with the attainment of food security and rural economic stability as justification. However, this is a possible source of risk (political risk) which financial institutions face. Some of these interferences have been detrimental to the sector (Peck Christen, *et al*., 2005). In Thailand, the government in 2001 initiated a Debt Moratorium Programme which later led to unpleasant economic consequences according to Tambunlertchai (2004). Similarly, in Zambia, Omnia, a fertiliser manufacturer and marketer was doing well with a scheme providing fertiliser to smallholders who did not have cash, till the government got involved and the company withdrew its credit supply (Peck Christen, *et al*., 2005). State interventions in the agricultural sector discourage private institutions from investing in the sector and Ghana is no exception. However, direct interventions of the government in agricultural finance have over the years been identified to have little or adverse effect on farmers (Asiamah, 2018).

Financial institutions adopt credit risk management measures to reduce the effects of the loan default (Awunyo-Vitor, Al-Hassan, Sarpong & Egyir, 2014). According to Coyle (2000) credit risk management is a means of recognising, evaluating and controlling the risk of a loan default. Financial institutions may transfer the risk to another party through insurance or avoid the risk by evaluating a client's repayment capacity before granting loans; they may also reduce the negative effect through collateralised lending and diversifying the loan portfolio or accept some or all the potential loss or actual consequences of the risk (Castro & Garcia, 2014). Recommended interventions in East Africa include risk-sharing mechanisms to encourage lenders to lend to the sector, borrower capacity building and lender capacity building to overcome the perception of high risk that limits engagement of the agricultural sector (Dalberg, 2018). Credit risk management measures are important to the survival of financial institutions because monies given out as loans are depositors' funds which must be protected (Afriyie & Akotey, 2013).

1.2 Problem Statement

A good number of financial institutions in Ghana do not find agriculture as an attractive sector to serve because of default risk and are therefore reluctant to finance the sector (Kwakye, 2012). Agricultural loan default has become a major problem of financial institutions in developing countries (Silesh, Nyikal & Wangia, 2012). Farmers have been locked out of the formal financial system as a result of low repayment rates (Awunyo-Vitor, 2012). In the Ghanaian context, non-performing loans to agriculture, fishing and forestry sector was 6% in 2017 (Bank of Ghana, 2017) and increased to 8.9% in 2019 (Bank of Ghana, 2019). Hence, loan portfolio dedicated to agriculture has decreased over the years (Ministry of Food and Agriculture, 2017). In 2016 and 2017 the share of credit allocation for agriculture, fishing and forestry was 3.6% and 4.1% respectively (Bank of Ghana, 2017; Bank of Ghana, 2018). Compared to non-agricultural sectors of the economy, credit

allocated by deposit money banks to agriculture declined from 4.47% in 2007 to about 3.7% in 2016 (Ministry of Food and Agriculture, 2017) and this is not good for agricultural and economic development (Hartarska, 2015). Non-agricultural sectors like commerce & finance, services, electricity and water sectors which is the highest recipient of total loan portfolio (58.3%) also has the highest non-performing loan ratio of 61.3% (Bank of Ghana, 2017).

Northern Region was the study area and it is one of the three regions with high incidence of poverty (Cooke, Hague, & McKay, 2016; Ghana Statistical Service, 2013). The major economic activity in the region is agriculture; about 75.50% of households earn their livelihoods from agriculture (Ministry of Food and Agriculture, 2017). Thus, agricultural financing should be prioritised because according to Al-Hassan and Poulton (2009), agriculture has the capacity to facilitate economic development in the region, but banks have consistently reduced their loan portfolios to agriculture because of the supposed riskiness of the sector. Therefore, it is important to assess factors that make agricultural loans risky from the perspective of both borrowers and lenders. A study that assesses the various perspectives will inform financial institutions better on the appropriate credit risk management strategies to adopt.

Maurer (2014), reported that financial institutions have used conventional methods such as asset-backed lending and evaluation of repayment capacity of borrowers to manage loan default. Other measures adopted are portfolio management (that is diversification), exposure management, contractual arrangements and agricultural value chain lending. The conventional credit risk management measures adopted by financial institutions are generic; that is, they are not specific to risk concerns (causes of loan default) in a particular area or environment, making them less effective or ineffective in managing the risk of loan default as intended. Innovative credit risk management strategies have been designed to dilute loan default; but to get the best fit for a situation, the causes of default in the area must be

identified to find the loan default management strategy that suits the situation. Innovations like the Warehouse Receipt System (WRS) have been designed to enhance access to seasonal credit; it is a mechanism that accepts commodities from borrowers as security to protect loans from default (AGRIFIN, 2015). This has been adopted in developing countries like Ethiopia, South Africa, Tanzania and Uganda (Onumah, 2003; International Finance Corporation, 2012). Group lending is also an innovative risk management measure that is adopted in areas where borrowers have limited collateral and distorted credit repayment habits. With this measure, the whole group is accountable for the debt of individual group members (AGRIFIN, 2015; Sharma & Zeller, 1997). This measure has been successfully used in Thailand and Bangladesh (Zeller, 1998). The concern for addressing this issue of agricultural loans from the supply side is because default or non-performing loans affects the sustainability of financial institutions (Musima, 2012; Afriyie & Akotey, 2013) and the agriculture sector will benefit more from sustainable financial institutions.

1.3 Research Questions

Given the perception of financial institutions that lending to farmers is risky, how do rural banks manage their lending to reduce loan default? To answer this main question it is necessary to address the following specific questions:

i. What are the causes of loan default from the perspective of farmers in the Northern Region?
ii. What are the causes of loan default from the perspective of Rural Banks in the Northern Region?
iii. What are the measures (traditional and innovative) taken by the Rural Banks to mitigate agriculture loan default in the region?
iv. What are the perceptions of the Rural Banks about the effectiveness of the measures they use to reduce default?

1.4 Study Objectives

The main purpose of this study is to examine the causes of loan default in the study area and assess management strategies rural banks apply in dealing with these causes of loan default. The specific objectives are to:

i. Identify the causes of loan default from the perspective of farmers in the Northern Region.
ii. Identify and rank the causes of loan default from the perspective of Rural Banks in the Northern Region.
iii. Identify the measures adopted by the Rural Banks to mitigate loan default in agriculture.
iv. Assess the perception of the Rural Banks about the effectiveness of measures they use to reduce default.

1.5 Significance of the Study

This research seeks to examine the causes of loan default and effectiveness of credit risk management measures adopted by rural banks. Findings from this study will help the financial institutions know what explains default risk and whether their risk management strategies address these factors. The findings will help the financial institutions formulate credit risk management strategies which are useful in improving bank performance. The outcome of the study will help financial institutions to identify key socio-economic characteristics that affect loan repayment when appraising borrowers' loan applications. Findings from the study will inform the government or non-governmental organisations on topics to address; when they decide to organise capacity building programmes for farmers and financial institutions to manage credit and develop appropriate credit risk management measures respectively. The findings of this study will identify the effects of credit risk

management measures on agricultural loan default. This study will also contribute to the literature in credit risk management of agricultural loans, in the context of Ghana.

1.6 Scope of Study

The study is on credit risk management measures in agricultural lending but it is limited to the measures adopted by Rural Banks in the Northern Region of Ghana. The study selected only Rural Banks in Northern Region because of resource and time constraints. The agricultural sector is financed by both formal and informal financial institutions but this study focused on Rural Banks because they are located in rural areas where agriculture is the major economic activity. Rural Banks were established to boost economic growth and improve the livelihoods of people in the agricultural sector (Awunyo-Vitor, 2012), hence the study focused on Rural Banks.

1.7 Limitation of Study

Access to certain information was the main constraint of this study. The representatives of the Rural Banks were reluctant to share some of the information needed for the study. Two of the Rural Banks declined giving information on the rate of loan default of their institutions. This restricted the depth of the analysis of the effectiveness of credit risk management strategies in reducing loan default.

1.8 Organisation of Thesis

The thesis is organised into five chapters. Chapter one is the introduction to the thesis; it comprises the background to the research, the problem statement, the research questions, the objectives and the significance of the study. Chapter two reports on literature on empirical studies related to the objectives of the thesis. Chapter three explains the concepts and theories underlying the thesis, methods of data analysis adopted, study area, the method of data collection, and sampling. Chapter four presents and discusses results from the data analysis, and chapter five presents the conclusion and recommendations of the study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter examines literature on empirical studies related to the objectives of the study; it also reviews empirical methods used in analysing the objectives. The discussion looks at relevant studies on the causes of loan default in the sector, the credit risk management measures used by financial institutions and their effects on loan performance.

2.2 Empirical Studies on Causes of Default Risk

Adedapo (2007), in a study on the default risk associated with agricultural loans, identified interest rates, amount of loans disbursed, administrative cost, transaction cost, the untimely release of loans, amount repaid, loan amount released and duration of the project to be causes of default. Other findings of the study by Adedapo were that banks had similar loan processing procedures, banks were not willing to service agriculture because of the low-interest policy which reduced their profits; and majority of loans given had a high tendency of default.

In a study by Agada, Iheanacho, and Ogbanje (2018), the causes of default were categorised into four groups: institutional related causes comprising untimely disbursement of loans as a result of bureaucracy in the loan approval process; poor loan supervision; insufficient assessment of borrower's capacity to repay loans and unclear credit guidelines of financial institutions. Client-related factors are namely loan diversion, poor business practices of clients and distorted credit culture of clients. Geo-environment factors are natural phenomena such as the death of a borrower, natural disasters and economic recessions. Market-related factors include, borrowers' lack of information on how to maximise profits from the sale of produce and this can affect profits and result in loan default. Agada et al., (2018) uncovered the causes of loan default among agricultural cooperatives. They found that

the most significant cause of default was the untimely disbursement of credit. Late receipt of credit delays planting and the rest of the farming activities; this can affect yield, cash flow as well as cause default. Lack of information on available market was the next significant cause of default; clients did not have the necessary information on where, when and who to sell produce to. Lack of integrity on the part of the borrower and the death of the client were the other major causes of credit risk from the perspective of the agriculture cooperatives in the study by Agada et al., (2018). Ayogyam, Goddana, Mohammed and Boateng (2013) also researched on loan repayment in a cooperative setting in Techiman, Ghana. Secondary data on the cooperatives were collected from the financial institution and primary data were compiled from the farmer groups. Binary logistic regression was adopted to explain the causes of farmers' ability to repay loans. The research sought to investigate the effect of these characteristics on the ability of the group to repay loans. The independent variables of the regression model were the average age of farmers, marital status, years of farming experience, number of religious groups in the cooperative, technical capability of the group leader, size of farmer group, the gender composition of the group and varieties of crops grown by the group. The regression results showed that all the characteristics except average age of members, number of years of farming experience and technical capability of group leader had a positive relationship with loan default.

Afolabi (2010), reported on the effect of socio-economic characteristics on loan repayment capacity of small-scale farmers in Nigeria. The socio-economic factors of the respondents were analysed with descriptive statistics. It was found that 47% of the respondents attributed their inability to repay loans to family commitment (expenses) which reduced their income. About 32% pinned their default on high cost of production, 17% connected loan default to the late release of loans by the financial institution and crop failure was the least cause of default amongst only 4% of the respondents. The socio-economic

factors that were regressed were years of farming experience, loan amount received, gross farm income, farm size, non-farm expenses, the interest rate charged and non-farm income. The regression results showed that among the eight coefficients only size of household and non-farm expenses had a negative relationship with the level of loan repayment of respondents.

Awunyo-Vitor (2012), also reported on the factors that influence loan repayment default in the Brong Ahafo Region of Ghana. The identified causes of loan repayment default were client's years of education, the age of client, off-farm income, shorter distance from the client to the lender, farm size, cash crops, loan amount, repayment period and offering financial literacy training. The results of the binary probit regression showed a significant and negative relationship of the factors with loan repayment default; meaning an increase in these factors led to a decrease in loan repayment default.

A study by Yeboah and Oduro (2018), was about causes of loan default in credit unions. A credit union is a financial institution that gives microcredit to members who cannot or for some reason will not access bank loans. Loan default threatens the sustainability of credit unions hence the objective of the study was to investigate the causes of loan repayment default among clients. The binary logistic regression results were that being married had an inverse relationship with loan default; non-formal education, low-income, loan diversion and monitoring had a significant and positive relationship with loan default. That is, these factors were more likely to cause loan default. The estimated coefficient of 'monitoring' however, was a deviation from the positive a priori expectation. When loan monitoring is not done properly this deviation from the a priori expectation is possible. No significant relationship was found with age, sex, household size and loan default in the study.

A study about farmers' perception of repayment of loan by Ayanda and Ogunsekan (2012), was to investigate the cause of loan repayment from the farmers' viewpoint to be able

to understand farmers' behaviour towards loan repayment obligation. Descriptive statistics was used to analyse the socio-economic characteristics of respondents, farmers' perception of loan repayment and a Pearson correlation test was used to check the relationship between socio-economic characteristics and loan repayment. The correlation test showed a significant linear relationship between age of the farmers and loan repayment. A negative relationship was found between late harvest, interest rate and loan repayment.

Yegon, Kipkemboi, Kemboi, and Chelimo (2014), investigated the effects of socioeconomic characteristics of smallholder farmers in Kenya on loan repayment. The target population was all smallholder farmers in a County who accessed loans from Agricultural Financial Corporation. Binary logistic regression was used to determine the effects of these characteristics on loan repayment. The factors that were identified from the estimation were categorised as personal factors, farming conditions and facility factors. Personal factors included gender, age, marital status, level of education, main source of income, main source of occupation and number of dependents. Only gender, level of education, main source of income and main occupation had a negative relationship with loan default. In other words, an increase in the number of female beneficiaries and any of the other factors lowered the probability of default. Farming conditions included type of farming, farm experience, seasonal loan use, buyer of produce, mode of payments for produce delivered, payment duration and difficulty in farming. These factors were positively correlated with probability of default. Facility factors consisted of loan amount, frequency of borrowing, frequency of loan officer's visits, the timing of loan disbursement, loan disbursement instalments, loan repayment instalments and they were inversely correlated with the probability of default. The study concluded that to reduce loan default, financial institutions should concentrate on personal factors and facility factors.

2.2.1 Similarities, differences and gaps in reviewed empirical studies

The literature reviewed reported that the underlying studies have the common objective of investigating the causes of default in loan repayment but the researchers did so in diverse ways. Loan default in the studies were defined as delinquent loans or non-performing loans that affect the operations of financial institutions. In the literature, the dependent variable resulted in two mutually exclusive alternatives; that is borrowers who default in loan repayment and those that repay loans. Afolabi (2010), Awunyo-Vitor (2012), Ayanda *et al*., (2012), Yegon *et al.*, (2014) investigated the causes of loan default among individual smallholders while Ayogyam (2013), Sharma and Zeller (1997), Zeller (1998), explored the causes of loan default on smallholder farmers in farmer cooperatives or farmer based-organisations. This variation in research focus is as a result of the fact that some financial institutions lend to individuals while others prefer to lend to groups because group lending offers a feasible way of extending credit to people with no or very limited collateral (Kloeppinger-Todd & Sharma, 2010).

From the literature reviewed, different methods of analysis were used; they are descriptive statistics, binary Logistic regression, binary Probit regression, Tobit regression and Pearson correlation test. The choice of the appropriate method of analysis was based on how loan default was measured in the study. These methods were used to identify the relationship between the explanatory variables and loan default. Works like Ayanda and Ogunsekan (2012), Ayogyam (2013), Yeboah *et al.*, (2018), Yegon *et al.*, (2014), Awunyo-Vitor (2012), adopted descriptive statistics to describe the socio-economic or demographic characteristics of their respondents and the Pearson correlation test, logistic regression, probit regression or tobit regression to explain the relationship between the dependent variable (that is loan default) and the independent variables. Afolabi (2010), Agada *et al.*, (2018) adopted

only the descriptive statistics as the method of analysis to describe the socio-economic characteristics and identify the relationship between socio-economic factors and loan default.

Common causes of default identified from the empirical studies were late loan disbursement, lack of market information, large household size and low educational level of clients. These can be categorised into personal, business and institutional factors. Unmarried borrowers and groups that have members with different religious believes were identified to be more likely to default in loan repayment. The factors identified can be further categorised into endogenous and exogenous factors. Exogenous factors include personal and business factors which are out of the direct control of financial institutions. Endogenous factors are the institutional factors that is the causes that can be controlled by the financial institution to manage loan default examples are; poor appraisal, lack of monitoring and improper client selection.

The gap identified in the empirical studies reviewed is that they all focus on the causes of loan default from the farmer's perspective only. Agricultural lending involves two parties the lender and borrower, hence to get a better understanding of causes of default in lending to agriculture, the perception of the lender concerning the causes of loan default must be interrogated. Also, the perception of the financial institution is important because it determines the lender's interest in the agricultural sector as well as the best credit risk management strategy to implement to mitigate default in loan repayment. A negative perspective also implies that financial institutions could be overly restrictive in extending credit to farmers.

2.3 Credit Risk Management Measures of Financial Institutions

Risk can be categorised according to its characteristics; the intensity of the risk, the degree of recurrence, extent of losses and coverage area (Maurer, 2014). Therefore, a vital step in risk management is to segment risk so as to select the appropriate management

strategy (World Bank, 2005). Risk management strategies have been categorised into three groups: risk transfer, risk pooling and risk retention (Maurer, 2014; World Bank, 2005). Risk retention is preventive, the use of mitigation and coping to manage 'normal' risk. This risk is frequent but causes limited damage. Risk pooling is a management strategy used to manage risks that have more significant impact but are less recurrent, for instance floods and droughts. Insurance instruments such as crop insurance and index-based insurance are examples of risk pooling tools. Unfortunately, these instruments are in pilot stages in developing countries (Maurer, 2014; Wenner, 2010). Risk transfer strategies are used to manage catastrophic occurrences like tsunamis and earthquakes. Though they rarely occur, their impact is fatal and clearly uninsurable; it takes government intervention and external donors to help manage risk at this level (World Bank, 2005). In developing countries, the option of transferring or pooling risk is either limited or non-existent as reported by Wenner (2010), hence the common options used by financial institutions are mitigating and coping with loan default.

According to Wenner (2010), to reduce the information imbalance or to help financial institutions know more about their clients, a thorough evaluation of borrowers has to be done by credit officers with an agricultural background. This is known as the credit evaluation or appraisal. Credit officers appraise the repayment capacity of borrowers to avoid adverse selection. Wenner (2010), elaborated that with asset-backed lending strategy, physical assets, preferably immovable assets (such as land) are required by the financial institutions as prime protection against default. This is the preferred default risk management strategy of formal financial institutions, especially commercial banks. However, this measure comes with its limitations; most lands used are not properly documented and even if documented, enforcement of the contract can be a challenge for the lenders. Management of loan portfolio can also be done by rationing and diversification of the lender's loan portfolio (Maurer, 2014;

Awunyo-Vitor *et al.*, 2014). Rationing causes lenders to reduce the portion of their credit to agriculture to ease the effect of default on the lenders. When diversifying their loan portfolios, the lenders are careful not to limit their service to a particular geographical location, a particular commodity or a particular type of household. The basic aim of this technique is to reduce loan of default. Excessive provisioning is the last line of defence when all default measures that are put in place give way; it is known as loan loss provisioning. It is the most costly credit risk management measure as it reduces the profits of the institution. The aim of this measure is to absorb the shock of default when all mitigation measures are unsuccessful (Maurer, 2014).

International Finance Corporation (2012), writing on innovative financial models explains that because of the nature of agriculture, measures to mitigate default risk effectively must consider that agriculture is seasonal and has a long gestation period, borrowers in the sector have limited collateral, the transaction and administrative cost for servicing the sector is high and agriculture is exposed to systematic risks. This report identified promising approaches of agricultural financial models used by different countries to service the agricultural sector and mitigate default risk. The study categorised these models into securities that are used as collateral or repayment source as follows; financing farmers, financing movable assets and financing farmers in value chains.

The financing farmers model uses group guarantee and/or the cash flow of borrowers as security. An analysis is done to get estimates of the borrower's earnings before the loan is approved. Group-lending is an approach under this model of financing; this approach uses members of a group as co-guarantors for a loan, meaning that members are jointly liable to default in loan repayment of other group members. This is the principal feature in this credit risk management measure (International Finance Corporation, 2012). Group lending is an old invention but the recent return is as a result of how successful it was with the Grameen Bank

in Bangladesh. SANSA in Sri Lanka, Credit Solidare in Burkina Faso and Bank for Agriculture and Agricultural Cooperatives (BAAC) in Thailand are financial institutions that have also been successful with joint liability lending (Sharma & Zeller, 1997). With group lending, screening, monitoring and enforcing repayment become the responsibility of group members and because of the joint liability of loan default, group members are motivated to look out for members who will flout the terms of the loan. This approach has the potential to reduce the transaction cost and administration cost in loan processing (Sharma & Zeller, 1997). But Hisaki (2006) posited that group lending does not improve loan repayment as claimed.

With financing movable assets, models use movable assets as collateral; these include farm produce (Warehouse Receipt Finance) and leasing equipment (Equipment Finance). Hollinger, Rutten and Kiriakov (2009), described Warehouse Receipt Finance as when the produce of the borrower (farmer) is used as collateral for loans from financial institutions; a receipt is issued for the stored goods in the warehouse to a farmer and this receipt can be used as collateral to secure bank loans. Beside the warehouse receipt finance helping farmers to use commodities as liquid collateral for loans, it also helps aggregators and processors secure supply of agricultural produce all year round. For the warehouse receipt system to function well, an enabling legal and regulatory framework is needed to ensure enforceability of the security (that is the warehouse receipt) and the smooth functioning of the model. In Ghana the warehouse receipt finance model is run by the Ghana Commodities Exchange with some financial institutions.

2.3.1 Cases of credit risk management measures

International Finance Corporation (2012) examines financial institutions that have successfully serviced the agricultural sector and managed default risk in different parts of the world, especially in developing countries. Equity Bank's approach to managing risk of loan

default in lending to agriculture is based on direct smallholder lending integrated into a supply chain partnership. Equity Bank in Kenya was able to fund smallholders with little collateral. This product called 'Kilino Biahara' used measures like group lending, capping loan exposure and reduced interest rates to manage loan default. Opportunity International also developed a financial model using the causes of loan default to lend to agriculture; it is called "Informed Lending". Informed lending is a parametric lending model based on the borrower's plot characteristics (size, altitude, access to water); the breakdown of borrower household size; and the crop profile (including the cost of production and returns). This model was run successfully in Ghana, Malawi and Mozambique but with some shortfalls in Malawi. Zambia National Commercial Bank (Zanaco) also has a credit facility for smallholders called the Munda credit facility. The facility adopted cash collateral by farmers and joint-liability as security to back loans for the smallholder farmers. If the repayment of the loan was not made in time, participation of the group for the next season was prohibited. The scheme increased from serving 600 farmers and 600 hectares in 2008/2009 to 4,026 farmers and 10,088 hectares in 2011/2012 farming season and no default was recorded in 2012. The National Microfinance Bank (NMB) in Tanzania adopted warehouse receipt finance system; the secured loans were given to registered farmer groups, individual farmers, commodity traders and business persons dealing with non-perishable commodities such as coffee, maize, cashew and nuts. The NMB disbursed $6million to 110,000 farmers in 2010 and as at 2012 NMB had incurred no losses. HDFC Bank, India similarly adopted warehouse receipt loan facility to finance farmers and small traders. HDFC generally finances between 65-75% of the receipt value with a competitive interest rate of 8-10% and a loan top-up is available for asset relationship customers. The institution reported lower default risk than with direct loan schemes. In Ghana, the value-chain financing was adopted by Ghana Grains Partnership, a consortium of Yara International and Wienco (Ghana) Ltd. The pilot of the

financing scheme started in 2009, with no external funding support. The Standard Bank financed the scheme with $8million in 2010. The scheme was still operational at the time of the IFC report in 2012. Zambia National Commercial Bank (Zanaco) similarly adopted value-chain finance to lend to Palaban Dairy Cooperative Society whose buyer was Parmalat. Over the years, Zanaco increased the total loan amount from $12,000 in 2006 to $120,000 in 2011 because loans were repaid on time. The bank was able to underwrite predictable cash flow and collect repayment through deduction at the income source. CRDB and NMB in Tanzania are financial institutions that have also successfully used value-chain financing to lend to agriculture.

2.4 Effectiveness of Credit Risk Management Measures

Besley and Coates (1995) have reported on the relevance of group lending on loan repayment incentives; specifically they assessed the effect of the joint liability principle on loan repayment decision. Besley and Coate (1995), compared their work with previous works on group lending by Stiglitz and Varian who interrogated the informational advantage of group lending. The main difference observed was that Stiglitz and Varian looked at the ability of group members to repay loans but Besley and Coate investigated the willingness of group members to repay and how peer pressure can increase the willingness of borrowers to repay loans. The study adopted game theory to investigate the effect of group lending on repayment decision of group members.

The outcome of the game-theoretic analysis showed that group lending can have both positive and negative effect on repayment. Positive effect results from the possibility that successful borrowers will repay the loans of partners who do not get good returns to make repayment. The negative effect is when members who can repay loans refuse to pay because some other members cannot pay and these will lead to the default of the whole group.

Sadoulet work as cited in Gine and Karlan (2006) and Hisaki (2006) have argued that penalties induced among group members in joint liability lending do not improve repayment as Besley and Coate (1995) reported. Hisaki (2006), reported that joint liability could not induce mutual insurance among group members (borrowers). Members who have been helped were more likely to default strategically; that is default on purpose. The objective of Hisaki's work was to challenge the argument that joint liability was efficient to reduce strategic default and improve loan repayment contrary to the findings of Besley and Coate (1995). The method of analysis was to implement eleven different types of repayment games with dynamic incentives in the study area. The game-theoretic analysis revealed that joint liability caused serious free-riding problems, induced strategic default and lowered repayment.

Kodongo and Kendi (2013) in a study compared and contrasted group lending and individual lending and why microfinance institutions adopted either of these financing approaches. The choice between these two approaches was based on the philosophical orientation of the financial institution which were named as the institutional approach and welfare approach. With the institutional approach, the sustainability of the institution is paramount hence the institution's goal is to cover all cost (financial and operations). With the welfare approach, the microfinance institution can be sustainable without necessarily being financially self-sufficient. Therefore, the institution balances alleviating poverty with financial self-sufficiency. Using the Likert scale to find the philosophical orientation of the microfinance institution the results showed that most of the microfinance institutions lent with the objective of institutional sustainability not poverty alleviation (welfare approach). The study proceeded to identify what motivated the choice of the two credit programmes (that is individual lending and group lending). The results showed that individual lending was used by microfinance institution whose goals were to alleviate poverty and maintain market

share, while group lending was adopted by those with the goal to reduce loan default and increase financial self-sufficiency. Despite the advantages of group lending, the study established that microfinance institutions prefer individual lending to group lending because of poor information networks in Kenya among group members that affected monitoring of loans.

Gine and Karlan (2006) unlike Hisaki (2006) investigated the difference not just between group lending and individual lending but group liability and individual liability lending. With the known merits of group lending with joint liability, the literature supporting this work reported that some microfinance institutions in Asia were growing rapidly with individual liability lending. The Grameen Bank in Bangladesh known for its success with group liability lending had relaxed its group liability lending terms. Groups were kept to reduce the transaction cost of the banks but now individual group members are held liable for their own default in repayment of loan. Hence the main objective of this work was to measure the change in key variables like repayment rate, savings deposit and loan size when group members were individually liable to loan repayment default. The analysis showed that conversion to individual liability had no adverse effect on the repayment rate and also no strong evidence backed the conclusion of Besley and Coate (1995), that group liability lending harnesses enough social collateral to check strategic default by group members.

The empirical studies reviewed explain that group liability lending improves repayment rate by preventing the financing of unqualified applicants, monitoring the use of funds, assessing the ability of group members to repay loans and enforcing payment by administering certain non-monetary penalties when group members are unwilling to repay loans. But the finding of Gine and Karlan (2006), was that group liability alone does not improve repayment rate and that there are other factors. This is because in their study, groups

which were jointly liable were converted to individualised liability (and groups were left intact) but repayment rates did not change much in that study.

2.5 Conclusion

Some characteristics of agriculture have made it unattractive to financial institutions. Exogenous shocks like pest and disease infestation which lowers output and returns, the seasonal nature of the agricultural sector, limited collateral are peculiar characteristics of the sector that do not encourage financial institutions to invest in agriculture. These characteristics of agriculture have been noted in literature to be major causes of default in agricultural loan repayment. Predominant causes of credit default risk are loan diversion by clients, limited collateral of clients, late disbursement of loans, high-interest rate and large household size of clients. Regardless of the risk that plague the sector, agriculture presents an opportunity for financial institutions to diversify their loan portfolios. Innovative measures have been designed to tackle limited collateral, high transaction cost of agricultural loans and poor loan monitoring issues in the sector. The warehouse receipt system, group lending, value chain financing and cash collateral are dominant innovations adopted to mitigate loan default risk.

Analysing the credit risk management strategies starts with identifying the causes of risk in agriculture, identifying the type of credit risk management measures adopted by the financial institution, and finally assessing the effectiveness of the credit risk management strategy in managing the prevalent risk. Information gathered from this literature reviewed contributed to the sequencing of the specific objectives in this study and has served as a guide in choosing the appropriate methods of analysis for this study.

CHAPTER 3

METHODOLOGY

3.1 Introduction

The study design was a mix of qualitative and quantitative methods. The conceptual and theoretical framework underlying the thesis are explained in this chapter. The methods of data analysis adopted for the various objectives of the study, information on the study area, the method of data collection and sampling methods used in the study are also discussed.

3.2 Conceptual Framework

The conceptual framework for this study depicts how variables in credit risk management are connected; it also illustrates the objectives of the study. The framework explains the importance of complete information in managing credit risk.

This study is supported by two major concepts; lending/credit and risk. The concept of lending in the context of this study is an agreement between two parties; a borrower and lender. The lender agrees to give an amount of money to the borrower on agreed terms that the borrower must pay at a later date. Also, risk as explained in the background to the study, is when decision-makers are uncertain about the outcome of future events because they do not have enough information (Merrill III, 2017). Thus, to manage risk, there should be some form of complete information. For a loan/lending transaction to be successful, both parties should have some essential knowledge of themselves. There is a break in contract when the borrower defaults; that is they are unable or unwilling to repay money when due as stated in the contract. The risk associated with this break in contract is known as loan payment default risk.

A lender is the financial institution (rural bank in this research) which provides agricultural loan services and borrowers are clients (farmer groups or individual farmers) of the financial institution. Before a financial institution can lend to a farmer, relevant

information is collected from the farmer, to assess the borrower's repayment capacity. Monies financial institutions lend out are mostly depositors' funds, therefore, they have to protect it by carefully selecting which clients to lend to. Information like the address of the farmer, educational background, type of crop cultivated, household size, annual cash flow of the enterprise, credit history and assets owned by the farmer are collected for a default risk analysis (Oheneaku, 2017). All these information bring into perspective the pros and cons of lending to these clients. The perspective of the financial institution is important because it informs their decision to lend or not and the type of credit risk management strategy to use for a client. Financial institutions can choose whether to use conventional risk management methods like asset-backed lending or innovative methods like group lending, warehouse receipt financing or value-chain financing. The mitigation measure has to be assessed to check its effectiveness in managing loan default for the necessary adjustments to be made.

The conceptual framework displayed in Fig 3.1 is the author's construct of concepts which drives the whole of the research study. Some variables were identified from the literature and are used to help explain, and understand the phenomena of loan default in agricultural lending. The conceptual framework maps-out actions and key actors in lending to the agricultural sector. Figure 3.1 shows that the main actors in agricultural lending are the lenders (financial institutions) and the borrowers (farmers or farmer groups). Before a loan is administered, the borrower must make a formal request and the lender will assess the information given before a decision can be taken (that is approve or reject loan application). Note that the explanation of the conceptual framework is based on the fact that financial institutions have continuously reduced the loan portfolio dedicated to agriculture because of the high default rate lending to the sector (Kwakye, 2012).

The sequence of agricultural lending based on the conceptual framework is as follows: A farmer makes a loan application with incomplete information about themselves

and their farm enterprise. In order to prevent adverse selection, banks must screen (evaluate repayment capacity) applicants thoroughly to retrieve relevant information to facilitate the selection of eligible applicants. Banks can now consider the applicants after identifying the potential causes of loan default. Then they adopt a strategy to manage the probability of a loan default before the loan can be disbursed. After loan has been disbursed, the farmer is expected to repay the loan at the time both parties have agreed on. The screening and credit risk management measure adopted can negatively or positively affect the loan performance. Also, the performance of the loan will determine how financial institutions engage with farmers in future transactions.

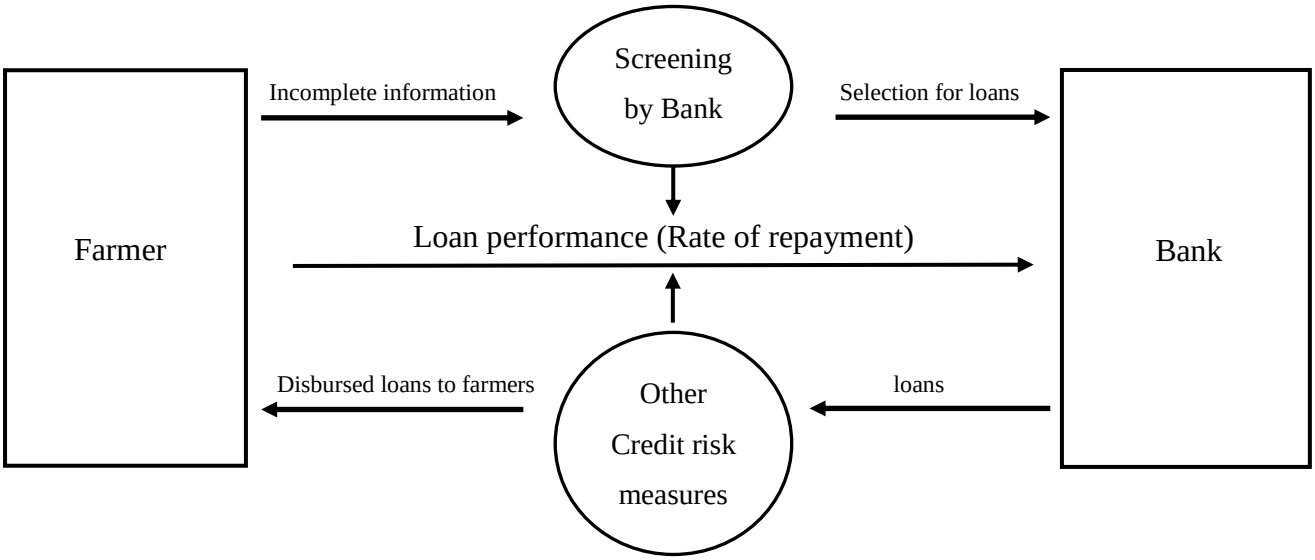


Figure 3.1 Conceptual Framework of Study

Source: Author's construct, 2019.

3.3 Theoretical Framework

The information asymmetry theory describes a situation where one party in a contractual agreement has more or better information than the other; this is typical in a lender-borrower relationship (Merrill III, 2017). Influential contributions on information asymmetry include works of Akerlof, Spence, Rothschild and Stiglitz (Merrill III, 2017; Auronen, 2003). With their analysis of information asymmetry on different markets, these

authors won the Noble Price in Economic Science in 2001. Stiglitz investigated the effect of information asymmetry on an insurance market and made some key findings. An insurer (seller of insurance product) may just know the probability of road accidents for a population but the buyer of the insurance has private information (is more aware of their driving skills and their probability of accidents). The insurance buyer can decide not to relay this important information to the insurer; this information imbalance is at the cost of the insurer. Stiglitz posited that the under-informed party can induce this information by screening the buyer; that is segregating the insurance buyers. This can be done when the insurer provides more options according to the probability of accident or driving skills with an incentive for buyers to choose from. For example, buyers can be given the options of paying high premiums-low deductibles or low premiums-high deductibles. Akerlof and Spence also investigated the effect of information asymmetry on product and labour markets respectively (Merrill III, 2017). Information asymmetry can occur before or after an agreement has been reached.

Imperfect information theory addresses topics ranging from economics to finance; it can affect the agreement between lender and a borrower and also has been used to explain the collapse of financial institutions in 2007 (Merrill III, 2017). When financial institutions do not have adequate information on the borrowers, it can lead to adverse selection or moral hazard. Adverse selection is selecting people who cannot or will not repay the loan. Moral hazard refers to borrowers who use loans for riskier ventures not agreed on in the loan contract. These are the ramification of information asymmetry in a credit transaction.

Financial institutions, in an attempt to avoid information asymmetry, choose to ration credit; they can mitigate the effect of imperfect information in lending transactions by screening (Merrill III, 2017). This is to identify good and bad risk clients and designing credit risk management strategies for them based on their individual causes of loan default. The screening devices are put in place to level information asymmetry (Auronen, 2003). Hence

identifying the actual causes of agricultural loan default reduces information asymmetry and the appropriate management measure to mitigate loan default will be adopted. This can encourage financial institutions to increase the loan portfolio dedicated to agriculture in the region.

3.4 Methods of Analysis

3.4.1 Identifying the causes of loan default from the farmers' perspective

Loan default is defined in the study as a delinquent loan; it is, therefore, a categorical dependent variable because a borrower can either default or not. A choice regression model which takes into account the categories can be used because of the dichotomous nature of the dependent variable (Ayogyam *et al.*, 2013). Ayanda and Ogunsekan (2012), Ayogyam (2013), Yeboah *et al.*, (2018), Yegon *et al* (2014) and Awunyo-Vitor (2012) adopted Logistic regression, Probit regression and Tobit regression model respectively to explain the relationship between loan default and independent variables. For this study, a binary logistic regression is used to explain default, which is measured as delinquent loans. Logit model limits probabilities for each value of the dependent variable between 0 (no default in repayment) and 1 (default in repayment) (Yegon *et al.*, 2014). The cumulative logistic probability is stated as:

$$P_i = F(Z_i) = 1 + \frac{1}{1+e^{-(\alpha_0+\Sigma B_i X_i)}} \quad \text{...(1)}$$

where;

P_i= Probability of default in repayment of loan

X_i= Explanatory variables

The log odds ratio that a client will default in loan repayment

$$\log\left\{\frac{P_i}{1-P_i}\right\} = Z_i = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_{10} X_{10} + U_i \quad \text{........................(2)}$$

where;

Z_i= Probability of default of loan repayment

X_1-X_{10}= Explanatory variables

U_i= Error term

β_1-β_{10}= Regression coefficient

Factors that influence credit default have been identified to be the characteristics of the agricultural sector (Bandyopadhyay, 2007). These characteristics are the exogenous risk factors associated with the agricultural sector, the seasonal nature of agriculture and limited collateral of clients (farmers). These characteristics were captured under different variables for the purpose of this study. Exogenous risk factors was captured as low yields as result of pest and disease invasion, seasonality of agriculture as falling/fluctuating market prices of agricultural commodities but limited collateral was captured as same. Credit default risk is the dependent variable of the regression and the variables that have been hypothesised to influence this dependent variable are borrower factors/characteristics (gender composition of group, age of group, marital status of group members,, religious composition of group, group size, off-farm income) and lender factors (loan usage training, loan supervision). These factors were adopted from works of Afriyie & Akotey (2013), Awunyo-Vitor (2012), Ayogyam *et al.,* (2013), Bandyopadhyay (2007) and Adedapo (2007); displayed in Table 3.1.

Size of the Group affects the probability of default; this study hypothesises that the higher the membership of a group the higher the credit default. According to Ayogyam *et al.,* (2013), big groups are less organised and members cannot monitor each other to do the right thing hence there is a high likelihood of credit default.

Marital Status is used as a dummy variable. It is hypothesised that the higher the number of married group members, the lower the probability of credit default. Ayogyam *et al.,* (2013) and Yeboah & Oduro (2018), found that this variable directly influences default risk negatively. It is assumed that married people are more responsible and would want to

protect their reputation. Hence as the number of married people increases in a group, the likelihood of credit default decreases.

Gender Composition is the percentage of group members who are men or women. According to Udho (2008) as cited in Yegon *et al.*, (2014) stated that male borrowers have a higher probability of default than women. According to Ayogyam *et al.*, (2013), single-sex groups have low credit repayment history and this will be the hypothesis to be tested. The a priori expectation for this variable is that mixed groups will have a negative relationship with loan default.

Religious Composition of Group is a dummy variable referring to the different religions in a farmer group. When members of a group have the same religious belief, it enforces their morals and there is a high probability of repaying group loans (Ayogyam *et al.*, 2013). Therefore, it is expected that the more polarised a group is in terms of religious belief, the higher the loan default.

Literacy is a dummy variable representing whether group executives are literate or not. A literate here is define as someone with at least basic education; can read and write. Group members (executives) with some level of literacy are expected to be quite knowledgeable and make better decisions for the group, compared to those who are illiterates. Therefore, a negative correlation is expected between literacy level and loan default (Yeboah & Oduro, 2018).

Variety of Crops is a categorical variable which describes a case where different types of crops are cultivated in a group. It is hypothesised that groups that cultivate more than one crop have a lower probability of default (Ayogyam *et al.*, 2013). This is because the farmer can repay loan even if one crop fails because of the diversity of cultivated crops.

Off-farm Income Generation describes clients who are engaged in other businesses which are not related to agriculture. Thus farmers who have supplementary income have a

high probability of repaying loans. It is expected that farmer groups with off-farm incomes have a lower probability of credit default than those without.

Liability in default, a categorical variable describes who repays a loan when a farmer group defaults in payment. It is a condition for granting loans especially when borrowers request for a group loan. Individual group members can be held liable for their own default or the whole group can be liable when a member defaults. Besley & Coate (1995), reported that group liability lending decreased the probability of loan default, inversely; Hisaki (2006) reported that group lending caused led to strategic default. For this study, it is hypothesised that group liability for a default lowers the probability of default. This is because group members will be monitoring each other to prevent misuse of funds.

Length of Relationship between farmer group and the bank is a continuous variable which shows how long the group has been doing business (borrowing and saving) with the bank. Older relationships are quite stable, coherent and well prepared to settle problems than younger ones. Therefore, the study hypothesises that groups that have been dealing with banks for long have a low probability of credit default.

Loan Supervision refers to the situation where the financial institution monitors the business activities of the borrower. Loan officers do this by paying business visits to the borrower's business premises. This is a dummy variable and it is expected to have a negative correlation with credit default.

Table 3.1 Causes of Loan Default

Variable name	Variable Description/measurement	A Priori Expectation
Gender	Gender composition of the group (mixed=2, male=1, female=0)	-
RelRB	Years of business relationship with rural bank	-
Marital Status	Marital status of group members (50%+=1, below 50%=0)	-
Literate	Literacy of group executives (yes=1, no=0)	-
RelGrp	Religious composition of the group (more than one =1 one=0)	-
GrpSz	Number of members in the group	+
Off-FI	Income from off-farm business (50% +=1, below 50% of members=0)	-
Crops Cultivated	Variety of crops cultivated (more than one=1, One=0)	-
Loan use monitored	Monitoring the use of loan (yes=1, no=0)	-
Who is liable for default	Liability in default Group=1, Individual=0	-

3.4.2 Assessing and ranking the perception of rural banks on causes of default

3.4.2.1 Assessing the perception of rural banks on causes of default

Psychometric methods are usually adopted for the quantification of qualities, abilities and perceptions (Semie, Belay, Karippai, & Bogale, 2009; Kothari, 2004); therefore a Likert scale was the technic applied to assess perceptions of Rural Banks about the causes of agricultural loan default. Likert scale is a tool widely used in social science and educational research to scientifically measure and validate human attitudes. This section discusses the construction of the Likert scale.

Rensis Likert a psychologist in 1932 developed this appropriate and simple method of scale construction known as summated ratings (Semie *et al.*, 2009). He constructed a series of statements, from extremely favourable to extremely unfavourable and the respondents were required to give their response in certain degrees of disagreement or agreement; categories of response to these statements could be 3, 5, 7 or even 10 but originally it was a 5-point scale

(Joshi *et al.*, 2015; Semie *et al.*, 2009). The generation of the statement or items is the first stage of constructing the Likert scale. The second stage is item analysis or analysing the responses. Kothari (2004) explains the Likert procedure for item analysis. The five-point responses to a statement represents various levels of disagreement or agreement to the statement and these five points constitute the scale; that is at one extreme end of the scale there is strong disagreement, midpoint agreement and strong agreement with the given statement at the other end. Each point carries a score hence at the end, every respondent yields a total score and this represents their thought or opinion in respect of a given view. If the questionnaire has 20 interrelated statements, the following values will be revealing:

20 x 5 = 100 most favourable attitude possible

20 x 3 = 60 a neutral attitude

20 x 1 = 20 most unfavourable attitude possible

The total score calculated for a respondent will be in the range of 20-100, scores below 60, equal to 60 or above 60 show unfavourable, neutral or favourable opinions to the given point of view respectively. If the questionnaire had a number of statements independent of each other, then the total score will be in the range of 1-5, and a mean score below 3, equal to 3 or above 3 shows unfavourable, neutral or favourable opinions to the given point of view respectively.

After a review of related literature (Addae-Korannkye, 2014; Adito *et al.*, 2012; Agada *et al.*, 2018; Ayanda *et al.*, 2012; Ayogyam *et al.*, 2013), fifteen independent statements were constructed to establish the perception of financial institutions about the causes of loan default in lending to the agricultural sector. Some researchers posited that 5-point scaling technic is preferable because it is easy to construct, administer and is sufficient to yield similar results as does the more laboriously constructed scale; 7-point and 10-point

scales (Semie *et al.*, 2009). Figure 3.2 is an illustration of a 5-point scale showing degrees of disagreement, neutrality and agreement to the constructed statements.

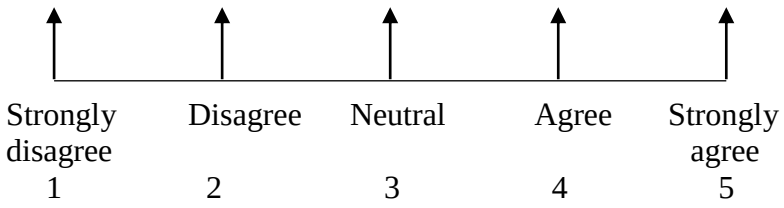


Figure 3.2 An Illustration of 5-Point Scale.
Source: Kothari (2004)

3.4.2.2 Ranking the identified factors of loan default in the financial institutions

Kendall's coefficient of concordance also known as Kendall's W is a non-parametric test used for assessing agreement among individuals selected to rate or judge. It is an important non-parametric measure of relationship of several sets of rankings (respondents); for two sets of rankings or judges, Spearman's coefficient of correlation is used but for more than two judges, the Kendall's W is the appropriate test (Kothari, 2004, p.307). The Kendall's W value of 1 indicates a perfect agreement among judges or respondents and a value of 0 indicates no agreement between the judges. This statistical method is used to investigate if there is an agreement among the five financial institutions regarding the causes of agricultural loan default or not. The formula for Kendall's W is:

$$W = \frac{12s}{k^2(N^3-N)} \quad \text{.....(3)}$$

where; $$s = \Sigma(R_j - \bar{R}_j)^2 \quad \text{.....(4)}$$

W= coefficient of concordance

s = sum of square of deviation of factors (causes of default) ranked

k = Number of respondents or judges

N = Number of objects ranked

The estimate for the agreement lies between $0 \leq W \leq 1$

W=0: no agreement between judges or respondents

W=1: perfect agreement between judges

In a case of numerous tied ranks, Kendall's W is computed by making an adjustment to the formula with 'T', which is a correction factor.

$$W = \frac{12s}{k^2(N^3-N)-k\Sigma T} \quad \text{.....(5)}$$

where;

T= the correction factor for tied ranked factors; T = 0 if there is no tie.

The formula for T is:

$$T = \frac{\Sigma(t^3-t)}{12} \quad \text{.....(6)}$$

where;

t = number of observations in a group tied for a given rank.

The Hypothesis tested is:

H_0: There is no agreement among the rural banks regarding the causes of default in agricultural lending.

H_1: There is agreement among the rural banks regarding the causes of default in agricultural lending.

The Kendall's coefficient of concordance is appropriate because the data collected have more than two respondents. Five rural banks in the Northern Region were asked to rank the causes of loan default prevalent in the institution. Also, Kendall's W determines an agreement in the rankings among the respondents but the Friedman and Garrett tests cannot. Friedman and Garret tests ranks and tests uniformity in the rankings but the Kendall's W in addition to that determines if there is an agreement between respondents. Kendall's W is a best fit for the data collected.

3.4.3 Identifying credit risk management measures adopted by rural banks

Credit risk management measures that are used by the Rural Banks were identified through questionnaire and personal interviews. Relative frequencies are used to describe the credit risk management strategies adopted by the five financial institutions. The relative frequencies present the credit risk management strategy adopted by the Rural Banks in the region.

3.4.4 Assessing the perception of rural banks on the effectiveness of credit risk management measures

The Likert procedure was also adopted to assess perceptions of financial institutions about the effectiveness of credit risk management measures adopted. Financial institutions were questioned to ascertain their perception on the effectiveness of credit risk management measures adopted in lending to the agricultural sector. Here too a 5-point scale was adopted to assess perceptions of respondents about the effectiveness of the risk management strategies of their financial institutions.

3.5 Method of Data Collection

3.5.1 Type and source of data

The data for the study were collected from primary and secondary sources. Primary and secondary data were used to address the objectives of this study. Primary data were collected from farmer groups to identify the causes of loan default from the farmers' viewpoint. Banks also provided information on their credit risk management measures and gave their perceptions about the effectiveness of the credit risk management strategies. Relevant information was also collected from the internet, books, articles, published and unpublished literature.

3.5.2 Sample size and sampling method

There are seven rural banks in Northern Region but only five were operational at the time of data collection. Also, three districts were purposively selected out of the five districts to investigate the causes of credit default from the farmers' perspective. A hundred and forty three farmer groups and thirty-one credit officers and credit managers were interviewed for the needed information.

Table 3.2 Distribution of Sample

Data source	District 1	District 2	District 3	District 4	District 5	Total
Rural Banks	A	B	C	D	E	
Number of Credit officers	8	11	6	8	6	39
Number of Credit Managers	1	1	1	1	1	5
Number of Farmer Groups	59	42	42	-	-	143

3.5.3 Survey Instruments and Statistical Tools

The data was collected with structured questionnaire through direct individual interviews with farmers. Questionnaires for the rural banks were sent to them to complete. The questionnaire was tested with one of the rural banks. The questionnaire for the farmers was also reviewed by the Projects Manager (Loans manager) of Bangmarigu Rural Bank to confirm if the questions were relevant to extract the needed information from the clients for the purpose of the study. The banks also provided lists of some farmer groups that they worked with. Microsoft Excel 2016 and Statistical Package for Social Sciences (SPSS) version 25 were the tools used to compile and analyse the data.

3.6 Study Area

3.6.1 The profile of study area

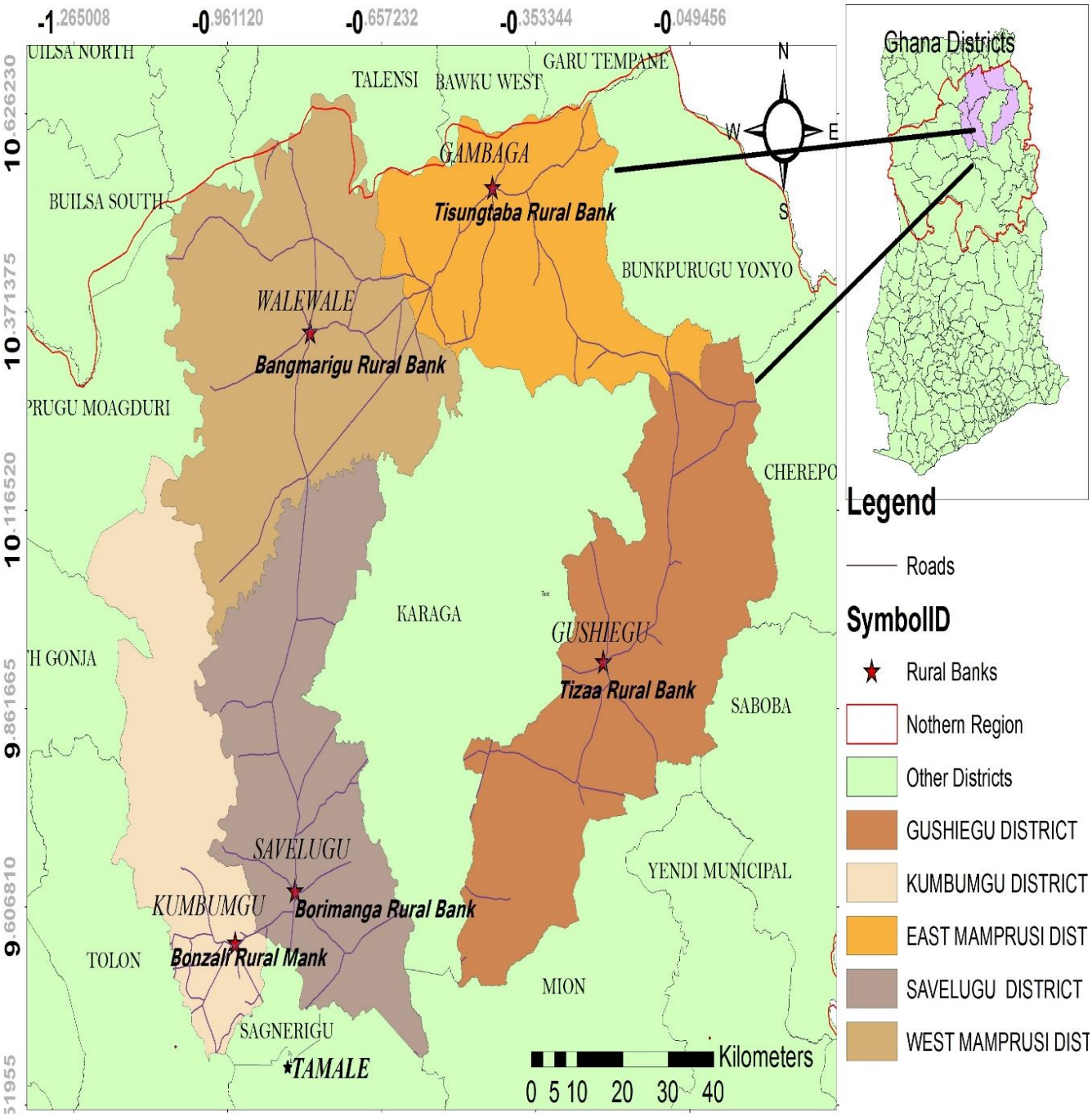
The study was conducted in the Northern Region of Ghana; the region covered an area of 70,384 square kilometres making it the largest region in terms of land mass in the

country (GSS, 2013), until two regions were carved out of it in 2018 (Regions-Government of Ghana, 2019). The region is bordered by the North East region to the north, Oti region to the south, bordered by Togo and the Savannah region to the east and west respectively. The climate is dry with a single rainy season that starts in May and ends in October; the dry season then starts in November and ends in March-April (GSS, 2013). The region had 29 Metropolitan, Municipal and Districts (MMDAs) but has been reduced to 16 MMDAs after the carving of two regions out of it (Ghanadistricts.com, 2019). The Northern Region had a total population of about 2.5million in 2010, an increase of about 36% from the 2000 population of about 1.9million. The region has a rural and urban population of about 1.7 million and 750,000 respectively, that is, about 68% of the total population of the region lives in rural areas (GSS, 2013). The majority of the people in the region are engaged in agriculture (GSS, 2013) and other economic activities like sales, services and transport. Commercial banks, rural and community banks, microfinance institution and financial cooperatives have branches and head offices in the region.

3.6.2 Rural banks in the study area

As at August 2018 there were about 144 licensed rural and community banks in Ghana (Ofosu, 2018). In the Northern Region, there were seven RCBs; Bangmarigu Community Bank in Walewale; Bonzali Rural Bank in Tamale; Buuwulonso Onestop Rural Bank in Damongo; Tisungtaba Community Bank/East Mamprusi Community Bank Gambaga; Tizaa Rural Bank in Gushegu; Zabzugu Rural Bank in Zabzugu; and Borimanga Rural Bank in Savelugu. All these RCBs provide agricultural loan services. Two of these rural banks were not functional at the time of the survey, therefore, five banks provided information for the study.

Figure 3.3 Map of Districts with Rural Banks



CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

This study sought to analyse credit risk management and assess the causes of agricultural loan default. This section of the study discusses the descriptive analysis of both groups of respondents, the causes of loan default identified from the perspective of borrowers and lenders, the rankings of these causes of loan default by the rural banks and lastly the effectiveness of the credit risk management measures adopted.

4.2 Descriptive Analysis of Respondents

4.2.1 Descriptive analysis of rural banks

This section discusses the profile of rural banks. Five rural banks were surveyed for this study and the main respondents were the Credit Managers. However the Credit officers in these financial institutions were also interviewed. The Rural Banks visited were Borinmanga Rural Bank in Savelugu, Bangmarigu Rural Bank in Walewale, Tisungtaba Rural Bank in Gambaga, Tizaa Rural Bank in Gushegu and Bonzali Rural Bank in Kumbungu. Tisungtaba and Bangmarigu Rural Bank are now in the North East Region, this is one of the new regions that were carved out of the Northern Region in 2019. These RCBs provide loan services ranging from agricultural loans, Credit with Education (CWE) loans, personal loans, commercial loans and microfinance loans but this study focused on agricultural loans. They provide other services including, savings accounts, current account, corporate account, fixed deposits and money transfers.

Table 4.1 shows that these Rural Banks have a total of fourteen branches in other locations in the Northern Region. The share of the Rural Banks' total loan portfolio to agriculture ranges from 5% to 35%. Rural Bank E has the least agricultural loan portfolio because of the high rate of loan default in the sector in the past years. Four of the five banks allocate 25% or less of their loan portfolio to agriculture. The agricultural loan portfolio of

the Rural Banks is relatively high compared to national allocation by money deposit banks; this could be because agriculture is the major economic activity in the rural areas. The default rate of agricultural loans over a five year period ranges from 5-35%. The banks understood default to be delinquent loans and these are loans that are overdue the agreed date of repayment. Their definition is consistent to the general definition of loan default. Rural Bank B uses the savings of the farmer group as security against loan default. This has resulted in low rate of loan default and a relatively high agriculture loan portfolio. This has contributed to the low loan default rate compared to the other banks. Rural Bank C has the highest loan default rate (35%) because of poor monitoring practices and a decision to make agricultural loans terminal.

Table 4.1 Profile of Rural Banks

Rural Banks	Branches	Loan Portfolio dedicated to Agriculture (%)	Loan Default Rate (%)
A	2	35	-
B	3	25	5
C	2	23	35
D	4	18	15
E	3	5	-

Source: Field Survey, 2019.

Table 4.2 shows that the rural banks have a total of 39 credit officers which includes the credit managers. The credit managers have titles like Project Manager, Head of Credit or Special Purpose Credit Coordinator, depending on the rural bank. The Credit Managers all have a background in finance with specialisations ranging from accounting, auditing and banking; and they have been working in the banking industry for about 10-15 years. About 28% of credit officers have a background in agriculture. It can be deduced from the Table 4.2 that Rural Banks with more credit officers who have a background in agriculture have lower rates of default compared to those with lesser. Providing agricultural loans demands specific technical expertise among loan officers (Maurer, 2014). The high default rate of Rural Bank

C could also be attributed to the relatively low numbers of credit officers with a background in agriculture. The required minimum qualification of a credit officer in any of these institutions is a first degree or a diploma in business or agriculture in some rural banks.

Table 4.2 Profile of Credit Officers of RCBs

Rural Banks	Credit Officers(C.O)	Professional Background of Credit Manger	C.O with Agriculture Background	Required minimum Qualification for C.O
A	6	Accounting and Auditing	1	1st Degree
B	8	Finance	4	Diploma
C	6	Banking	2	Diploma
D	8	-	4	Diploma
E	11	Accounting	0	Diploma

Source: Field Survey, 2019

Loans from rural banks can be processed and approved between 2-4 weeks of submitting a loan application (Table 4.3). The rural banks give short-term loans and long-term loans. The repayment time for short-term loans is between three months and eight months depending on the rural bank and with an interest rate ranging from 25%-30% per annum. For long-term loans the repayment time ranges from 12 months to 36 months depending on the rural bank, with the same range of interest rates charged as short-term loans for some banks.

Table 4.3 Types of Agricultural Loans

Rural Banks	Loan Processing and Approval Time (weeks)	Repayment Duration Short-term loans (months)	Repayment Duration Long-term loans (months)	Interest Rate Short-term loans (%)	Interest Rate Short-term loans (%)
A	2	6	18	30	30
B	2	6	24	25	25
C	4	12	36	25	33
D	2	3	12	30	30
E	4	8	36	30	30

Source: Field Survey, 2019.

Table 4.4 shows the maximum and minimum loan amount given for short and long–term loans and these vary depending on the RCB in question. Some rural banks give as low as ¢100 and while others give as much as ¢30,000 for short-term loans. Even though long-term loans are not that common among these banks, the banks can give as much as ¢75,000 and as low as ¢500 for long-term loans. The amount Rural Bank C can give as a short-term or long term loan depends on the amount the farmer group have as savings, because this is what the bank uses as security for the loans administered.

Table 4.4 Loan Range

Rural Banks	Short-term Loan Amount (Range)	Long-term Loan Amount (Range)
A	¢500-30000	¢1000-50000
B	-	-
C	¢500-10000	¢500-10000
D	¢300-2000	¢2000-30000
E	¢100-10000	¢1000-75000

Source: Field Survey, 2019.

The most common condition among the five rural banks for a borrower to get a loan is that the borrower should be an account holder of the bank and they should have a good credit history (Figure 4.1). Three out of the five rural banks require that farmers request for the loan in a group and also they prefer that borrower must have some form of collateral. Also, with all the rural banks the literacy level of the lender is not criteria used to assess the borrower's loan request.

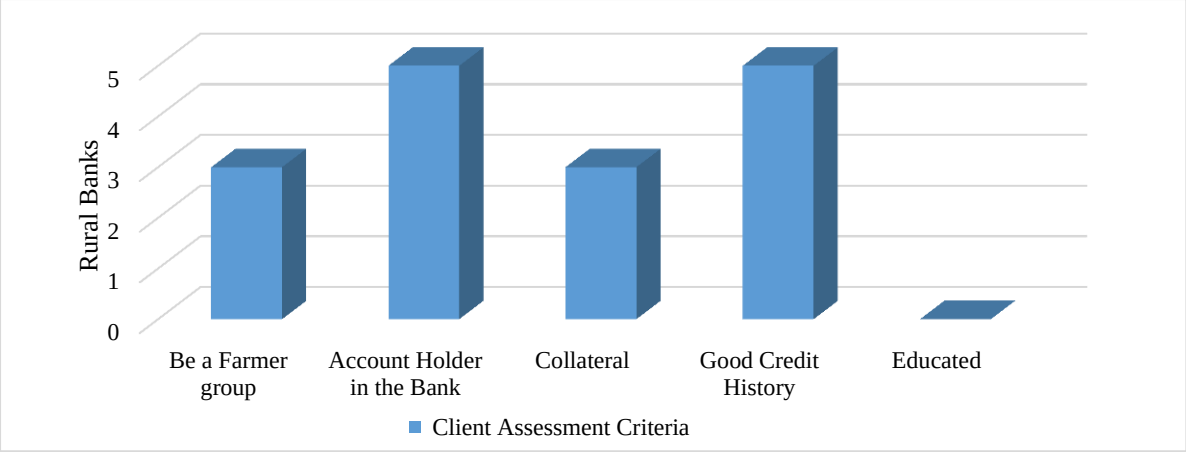


Figure 4.1 Client Assessment Criteria

Source: Field Survey, 2019.

4.2.2 Descriptive analysis of farmer groups

The farmer groups have been in operation for between 1 year and 20 years with a mean of about 7 years. The standard deviation of 3.995 suggests that most of the farmer groups have been in existence for about 7 years. The membership ranges between 6 and 90, with a mean of 21 (Table 4.5). The largest group has been in existence for about 10 years. The age of farmers in a farmer group is between 30 and 60 years. The average age of groups members is about 41 years with a standard deviation of 6.548, this means most of the farmers are within the age of 40 years and below.

Table 4.5 Age Profile of Farmer Groups and Group Membership (n = 143)

Percentage of married group members	Frequency	Percentage
Below 50%	2	1.4
50% +	141	98.6
Total	143	100

Source: Field Survey, 2019.

Table 4.6 shows the percentage of members in the farmer groups who are married. This was categorised into groups with less than 50% of its members married and groups with more

than 50% of members married. From Table 4.6, almost 99% farmer groups have more than 50% of their members married.

Table 4.6 Marital Status of Group Members

Statistic	Age of Group	Group Membership	Average Age of Group Members
Minimum	1	6	30
Maximum	20	90	60
Mean	7.03	21.02	41.68
Standard Deviation	3.995	11.940	6.548

Source: Field Survey, 2019.

Some groups in the sample were made up of female and male farmers but others were single-sex groups. Table 4.7 shows that male groups dominated the sample. Table 4.7 shows that 50% of the groups were male groups, 27% were mixed groups and 23% were females only groups.

Table 4.7 Gender Composition of Farmer Groups

Gender Composition	Frequency	Percentage
Female Group	33	23.1
Male Group	72	50.3
Mixed Group	38	26.6
Total	143	100

Source: Field Survey, 2019.

Figure 4.2 shows that most of the farmer groups had a mixture of religious beliefs. About 104 groups were made up of more than one religion and 39 groups were made up of members with the same religious belief.

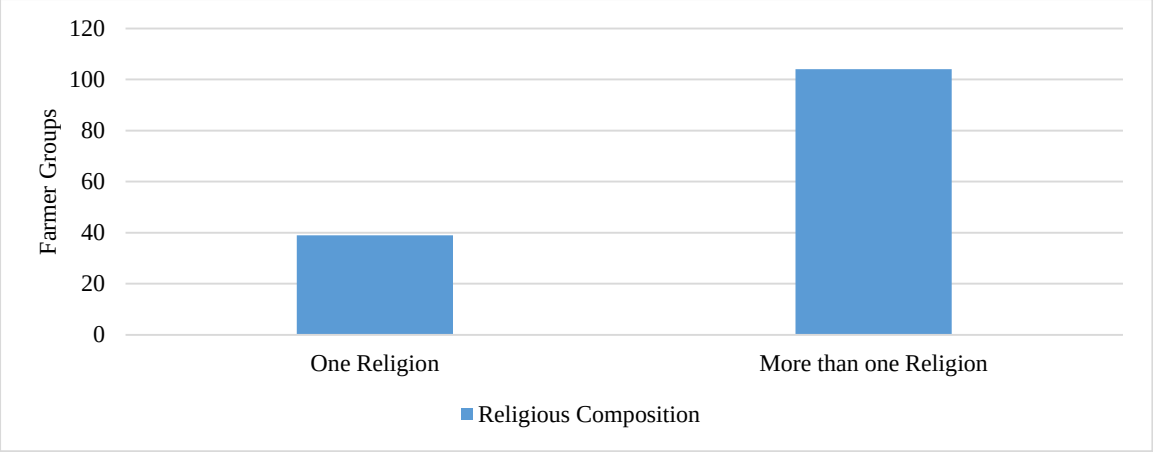


Figure 4.2 Religious Composition of the Group

Source: Field Survey, 2019.

The executives of a group are composed of the chairman, secretary and treasurer. Table 4.8 shows that about 60 farmer groups have all or some of its group executives with some form of education; 82 farmer groups have group executives with no form of education. In other words, about 57% of the groups sampled had literate group executives and 42% had illiterate executives.

Table 4.8 Literacy of Group Executives

Literacy of Group Executives	Frequency	Percentage
Group Executives not Educated	82	57.3
Group Executives Educated	60	42.0

Source: Field Survey, 2019.

In terms of registration, 60% of the groups were registered as cooperatives with the Department of Cooperatives (Figure 4.3).

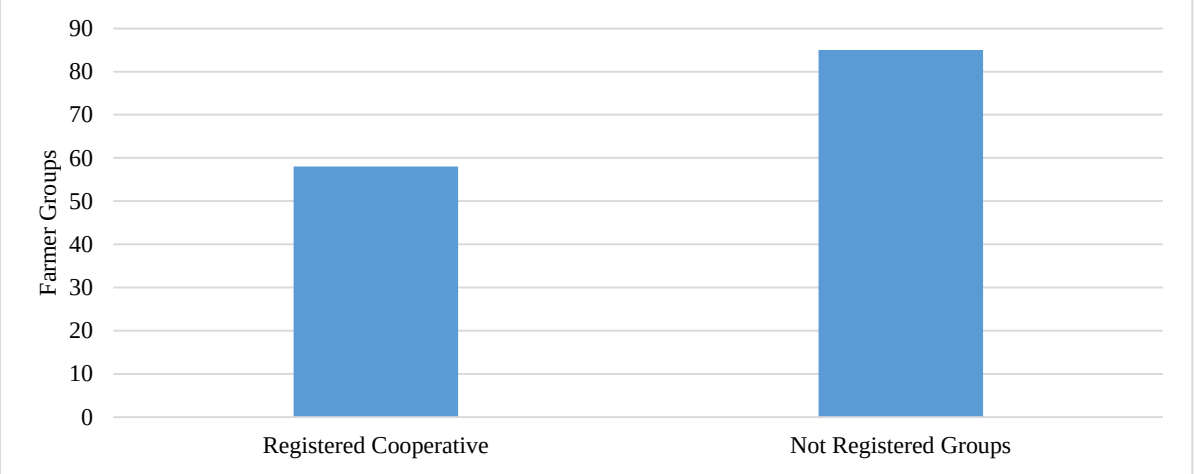


Figure 4.3 Farmer Group Registration Status

Source: Field Survey, 2019.

4.3 Causes of Loan Default from Farmers' Perspective

The results of the binary logistic regression estimation to explain loan default are presented in Table 4.9. Data from 95% of the sample of 143 farmer groups was used in the analysis.

Table 4.9 Case Process Summary

	Number	Percentage
Data in Analysis	136	95.1
Missing Data	7	4.9
Sample Size	143	100.0

Source: Field Survey, 2019.

Table 4.10 shows the estimated logistic model and summary of the model diagnostics. The statistics on the appropriateness of the model to predict the dependent variable and measure of variation explained by the model used are presented in the table. The -2 Log Likelihood statistic measures how poorly the regression model predicts the dependent variable. Smaller values are desirable, and the table shows a value of 41.116[a] which means that the model is good in predicting if there will be a loan default or not. The Cox & Snell statistic and the Nagelkerke r-square are known as pseudo r-squares. They are similar to r-square in a multiple

linear regression but not as reliable. A Nagelkerke r-square value of 0.856 means that about 85% of the variation can be explained by the model.

The Hosmer-Lemeshow test is a goodness-of-fit test. This test assesses if the model is correctly specified and the data and assumption of the model do not conflict. With the Hosmer-Lemeshow test, a value greater than 0.05 means the data used is a good fit for the model. The data in this study is a good-fit for the model because Table 4.10 shows a Hosmer-Lemeshow value of 0.438.

Out of the ten explanatory variables five had statistically significant relationships with agricultural loan default. These five variables are the size of farmer group, literacy level of group executives, farmer group with more than fifty percent of members involved in off-farm businesses, length of business relationship between the farmer group and the bank, financial institutions that monitor loan usage.

The size of the farmer group is a determinant of agricultural loan default. Table 4.10 shows a positive and statistically significant coefficient (B) meaning that as the size of a group increases the probability of loan default increases. This result agrees with the a priori expectation of the regression. The odds ratio (ExpB) of the group is 1.093, meaning that for a one unit increase in group membership, the odds of agricultural loan defaulting is higher by a factor of 1.093. This result is in line with a study by Impavido (1998), who posited that the larger the group membership, the harder it is to monitor members and efficiently manage the group, resulting in default. Supervision of group members and management become a challenge for group executives when group size is large.

The literacy of group executives also has a positive and significant relationship with loan default and this concurs with studies by Nam & Duy (2016), Kamau (2010) and Eze & Ibekwe, (2007). They discovered that educational level affected the probability of loan repayment on time. This result, however, deviates from the a priori expectation of the effect

of the variable. It was expected that literate group executives will facilitate the use of the loan better and repay on time; or they will be in a position to know members better and this will result in efficient screening and supervision of how group members use loans. The unexpected result can be attributed to a large group size. A group with large number of members has the potential of making even educated executives inefficient because of the numbers they are managing.

Off-farm employment was also identified as a significant determinant of low agricultural loan default in this study. Groups with more than fifty percent of members engaged in off-farm businesses have 0.23 less odds of loan default compared to those with less than 50% engaged in off-farm activities. This is in line with the a priori expectation of the regression. Hamza (2007) and Sileshi et al., (2012), suggested that by diversifying sources of income, farmers mitigate their exposure to risk. When farmers are engaged in off-farm businesses they get additional income to supplement their farm income to pay off their loan if there is a bad harvest or falling market prices.

The years of business relationship between the bank and farmer group has a tendency to reduce with loan default. This is because a farmer group which has been doing business with a bank for a while will have the capacity to manage their loans better and repay on time. Farmers with experience in using agricultural loans have access to formal credit because they are trusted (Yehuala, 2008).The odds ratio (ExpB) for this variable in Table 4.10 means that when the years of business relationship increases by an additional year the odds of loan default is likely to fall by a factor of 0.653.

Monitoring how groups use loan is also identified as a determinant of loan default as also found by Agada (2018). The probability of loan default decreases when financial institutions increase supervision of loans. Groups that are monitored by the bank have a lower odds of 0.018 of default compared to those not monitored. Ayanda & Ogunsekan (2012), in a

study on the perception of farmers on repayment of loan also found that poor loan supervision had the effect of increasing the probability of agricultural loan default.

Table 4.10 Estimated Logistic model Explaining Loan Repayment Default

Explanatory Variables	B	Sig.	Exp(B)	95% C.I. for EXP(B)	
				Lower	Upper
Size of the group (members)	.089	.022	1.093	1.013	1.179
Groups with more than 50% of members married	-15.452	1.000	.000	.000	.
Male Group	.005	.997	1.005	.083	12.157
Mixed Group	-1.772	.272	.170	.007	4.013
Groups with more than one religions	2.307	.264	10.042	.175	575.838
Educated group executives	4.968	.004	143.774	4.791	4314.693
Cultivating more than one predominant crop	1.917	.091	6.801	.737	62.786
Farmer groups with more 50% of members involved in off-farm businesses	-3.769	.037	.023	.001	.798
Group liability lending	-.751	.446	.472	.068	3.257
Length of relationship between group and the bank	-.426	.010	.653	.473	.901
Financial institutions monitoring loan usage	-4.011	.001	.018	.002	.208
-2 Log likelihood	41.116[a]				
Cox & Snell R Square	.607				
Nagelkerke R Square	.856				
Chi-square	6.98				
Hoshmer & Lemeshow Test sign. level	.438				

Source: Field Survey, 2019.

4.4 Perception of Financial Institutions on the Causes of Loan Default

This section examines financial institutions' perception about the causes of loan default among rural banks in the Northern Region. Likert scale was the tool used in collecting the data and the mean score was used in identifying the causes of loan default. The data was

collected from thirty-one credit officers who are directly involved in administering agricultural loans. Sixteen causes of default which were identified in literature were categorised into client-related (different religions in a group, young and inexperienced farmer group, mixed sex group, farmers with limited collateral, farmers perceiving loans as handouts and uneducated group executives); market and production related (fluctuating market prices of agricultural products, farmers diverting loans, farmers not engaging in off-farm businesses, undue state interference, bad weather and pest invasion); and institutional related causes (inadequate information on credit history, high interest rates charged, poor loan supervision, delay in loan delivery) were identified from reviewing literature. Credit officers gave their response in degrees of disagreement or agreement on a 5-point scale. Identified causes of agricultural loan default that had a mean score below 3, equal to 3 or above 3 are unfavourable, neutral or favourable opinions respectively to the given point of view.

The perception index in Table 4.11 shows that all respondents strongly disagreed that different religions in a group can lead to credit default. A study by Ayogyam et al., (2013) on loan default in Techiman, Ghana discovered that religious composition of a farmer group could affect loan default but this was not the case in the Northern Region of Ghana. Other variables like the gender composition of a group, age of the group, farmers not diversifying their sources of income (not engaging in off-farm business) had a mean score below 3.0 which means that the financial institutions disagreed that these factors can cause agricultural loan default. Credit officers all together showed a neutral (mean score equal to three) opinion on state interference being a determinant of credit default, even though 65% of them agreed to this statement. Causes of loan default as perceived by financial institutions are size of group, farmers with limited collateral, farmers perceiving loans as handouts, uneducated group executives, fluctuating market prices, inadequate information on credit history of borrowers, poor loan supervision by lenders and delay in loan delivery. Some of the clients of

the rural banks believe the loans are from the government. Hence they use the loans for different purposes and are reluctant to repay loans at the agreed time. This explains why loan diversion and farmers perceiving loans as government handouts are causes of default in the region. The problem with collateral is that most of the clients of the rural banks do not have registered assets to secure loans; sometimes the banks must incur the cost of registering the collateral. There is often the difficulty of selling the property when farmer defaults. The issue of poor supervision as a cause of default was attributed to inadequate logistics (cars, motorbikes) to properly monitor loan usage and encourage borrowers to repay loans on time. Farmers relaxed with loan repayment because loan officers did not exert the necessary pressure for them to repay loans. All these results are consistent with the findings of Ayogyam *et al.*, (2013) and Sharma & Zeller (1997). Yeboah & Oduro (2018) have also reported a positive relationship between illiteracy, poor loan supervison and loan default; while Afolabi (2010) has found late loan disbursement to

positively affect loan default.

Bad weather and pest invasion which cause low farm yields and farmers diverting loans for other purposes are identified as the major causes of default. These two causes had a mean score of 5 which means the rural banks in the region strongly agreed that these two factors are causes of agricultural loan default in the Northern Region. Bad weather and pest invasion coupled with poor monitoring of loans were the causes of the high default rate in Rural Bank C. Therefore, to mitigate the rate of default management of the bank has made it mandatory for all farmers to insure their crops before making a loan request. But most of the farmers have not met this condition yet.

Table 4.11 Causes of Default Perception Index

Causes of Default	Mean Score	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)	Total
Different Religions in a group	**1.0**	100	0	0	0	0	100
Young and inexperienced farmer group	**2.3**	10	65	16	10	0	100
Mixed sex group	**1.5**	45	55	0	0	0	100
Size of Group	**3.5**	0	0	45	55	0	100
Farmers with limited collateral	**4.1**	0	0	10	74	16	100
Farmers perceiving loans as handouts	**3.8**	10	0	0	81	10	100
Uneducated group executives	**3.5**	0	0	55	35	10	100
Farmers diverting loans for other purposes	**5.0**	0	0	0	0	100	100
Farmers not engaging in off-farm businesses	**2.9**	0	45	16	39	0	100
Undue state interference in the agricultural sector	**3.0**	26	10	0	65	0	100
Falling fluctuating market prices of agricultural products	**4.6**	0	0	0	39	61	100
Bad weather and pest invasion causing low farm yields	**5.0**	0	0	0	0	100	100
Inadequate information on credit history of borrower	**4.4**	0	0	0	65	35	100
High interest charged	**3.1**	0	39	26	26	10	100
Poor loan supervision by financial institution	**4.2**	0	0	0	81	19	100
Delay in loan delivery	**4.0**	0	0	0	100	0	100

Source: Field Survey, 2019.

4.5 Ranks of Causes of Loan Default

Table 4.12 ranks the causes of loan default among rural banks in the Northern Region. Data for this objective was collected from credit managers only because they are at the helm of banks' credit issues. From the table, the high ranked cause of loan default are farmers diverting loans for other purposes, bad weather and pest invasions that affect harvest,

fluctuating market prices of agricultural commodities, poor loan supervision by financial institutions. Also, some of the low ranked causes were different religions in a group, mixed sex group, young and inexperienced farmer groups, farmers not engaging in off-farm businesses, big group size and high interest rates charged on loans.

When farmers divert monies borrowed for unproductive and personal use, there is a high likelihood of loan default. This is because the loan would not be used for a productive enterprise to generate any profit; hence borrower is likely to default in loan repayment. The results show that rural banks in the region rank this factor highly as a cause of loan default. Also, Ayogyam *et al.*, (2013) reported that farmer groups with same religious beliefs tend to be united and organised. Hence different religions in a group is a potential cause of default; the table shows that this factor is the least ranked cause of default in the region.

The Kendall's Coefficient of Concordance (W) tests if there is an agreement among the banks in the region on the causes of loan default. A 73% agreement was reported among the banks regarding the ranking of the causes of loan default in the region (Table 4.12). Therefore, the null hypothesis which is, there is no agreement among the rural banks regarding the causes of loan default in agricultural lending in the region, is rejected.

Table 4.12 Ranking of Causes of Loan Default

Causes of Loan Default	**Mean Score**	**Rank**
Farmers diverting loans for other purposes	4.00	1
Bad weather and pest invasion causing low yields	4.40	2
Falling fluctuating market prices of agriculture commodities	4.80	3
Poor loan supervision by financial institution	4.80	3
Undue state interference in the agricultural sector	5.10	4
Farmers perceiving loans as give-aways or handouts	6.30	5
Inadequate information on credit history of borrowers	6.40	6
Delay in loan delivery by financial institution	6.80	7
Farmers with limited collateral	7.70	8
Uneducated group executives	8.00	9
High interest charged by banks	10.10	10
Size of Group	11.80	11
Farmers not engaging in off farm businesses	12.40	12
Young and inexperienced farmer group	14.00	13
Different religions in a group	14.70	14
Mixed sex group	14.70	14
Kendall's W=.730 DF=15 Asymp. Sig.=.000		

Source: Field Survey, 2019.

4.6 Credit Risk Management Measures Adopted by Rural Banks

The literature review identifies certain strategies used to manage loan default. Both conventional methods like asset-backed lending and innovative methods like group lending have been adopted by rural banks to manage the effect of credit default risk. The main credit

risk management measures used by rural banks in this study were classified into: preventive measures, mitigation strategies and coping strategies of loan default. The strategies predominant in Rural Banks in the Northern Region are displayed in Table 4.13. Evaluation of repayment capacity of borrowers is the most used default risk management measure. All the five rural banks in Northern Region have adopted this measure to prevent loan default. Two out of the five rural banks ration loans dedicated to agriculture as a credit risk management measure. None of the banks add a margin to interest rate charged on loans as a precautionary measure to prevent credit default. Collateral backed lending, diversification of loan portfolio and accessing credit bureaus are strategies which are classified as mitigation measures. From Table 4.13, it is evident that both collateral-backed lending and loan portfolio diversification are the predominant measures. They are used by three out of five rural banks. Using credit bureaus is the least adopted measure because of high fees charged to access information on borrowers and constant network problems. Coping measures are the last line of defence for Rural Banks in managing loan default. For this measure, 80% of rural banks in the Northern Region (that is four out of five) use this loan loss provisioning as a loan default management measure. These four rural banks build reserves against loan default to internally absorb the effects of default.

Table 4.13 Credit Risk Management Measures Adopted by Rural Banks

Credit Risk Management Measures		**Relative Frequency (Percentage) N= 5**
Preventive Measures	Evaluation of repayment capacity	100
	Rationing	40
	Margin on interest rate for risk	0
Mitigation measures	Collateral backed	60
	Diversification of loan portfolio	60
	Credit Bureau	20
Coping measures	Loan loss provisioning	80

Source: Field Survey, 2019.

Figure 4.4 shows the innovative measures that rural banks have adopted to mitigate loan default. Group liability lending is used by all the rural banks in the region. Other measures like warehouse receipt financing and value-chain financing have also been adopted by some rural banks to manage credit default.

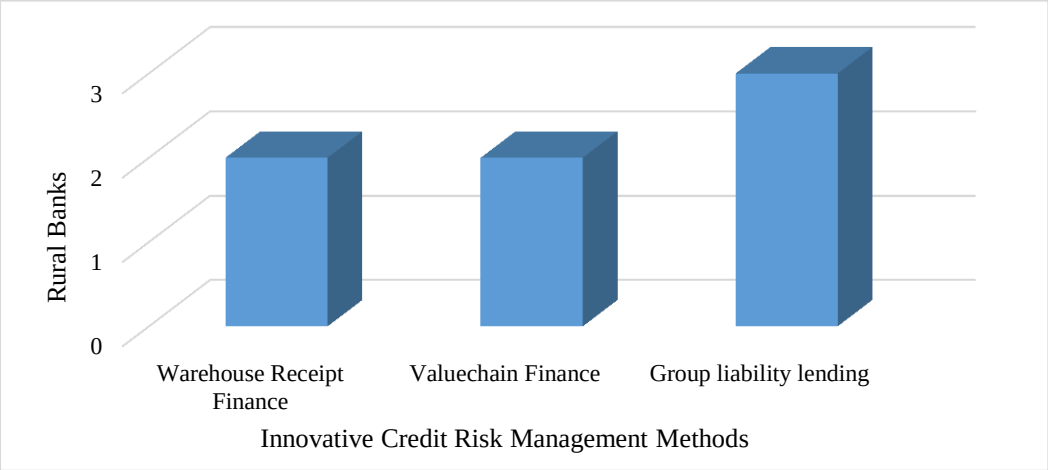


Figure 4.4 Innovative CRM Measures Adopted

Source: Field Survey, 2019

4.7 Perception of Rural Banks on the Effectiveness of Credit Risk Management Measures

Likert procedure was used to collect data from credit officers to assess the effectiveness of these credit risk management measures. Effectiveness was defined by the banks as measures which over the years has helped them to reduce rate of default, adverse selection and moral hazard. Ineffectiveness was defined as those which have been abandoned because they increased the rate of default of the banks. The results displayed in Table 4.14 show that none of the credit risk management measures has a mean score below 3, in other words, none of the credit risk management measures was completely ineffective. Credit evaluation appraisal system is an effective management strategy because it had a mean score of 4.4. This strategy involves understanding the client's enterprise, the risks and causes of success (Maurer, 2014). The various Rural Banks had different ways of evaluating repayment capacity of the borrowers. Sixty-five percent of respondents agreed that this measure was

effective and thirty-five percent agreed it was highly effective. Rural Banks also diversify their loan portfolio as a measure of managing credit default risk. Banks diversify their agricultural loan portfolio by lending to off-farm businesses in the communities and outside as well. Mean score of 4.1 shows that Rural Banks perceive this to an effective credit risk management measure. Table 4.14 shows that asset-backed lending, group lending, credit rationing are perceived to be effective credit risk management measures because they have mean score above 3. Ninety percent of the respondents had neutral opinions about the effectiveness of group lending as a strategy and 10% perceived this measure to be ineffective. This result supports Hisaki's (2006) view that group lending is gradually becoming an unpopular measure in managing agricultural loan default. Most of the rural banks surveyed had neutral opinions on the effectiveness of this measure, nonetheless group lending is the most adopted innovative credit risk management measure in the region.

Table 4.14 Effectiveness of Credit Risk Management Measures Perception Index

Credit Risk Management Measures	Mean score	Very Ineffective (%)	Ineffective (%)	Neutral (%)	Effective (%)	Very Effective (%)	Total (%)
Credit Evaluation Appraisal System	**4.4**	0	0	0	65	35	**100**
Use of Collateral	**3.5**	0	10	26	65	0	**100**
Rationing	**3.4**	0	0	65	35	0	**100**
Diversification of loan portfolio	**4.1**	0	0	0	90	10	**100**
Group Lending	**3.5**	0	39	10	16	35	**100**
Warehouse receipt system	**3.2**	0	0	81	19	0	**100**
Out grower schemes	**2.9**	0	10	90	0	0	**100**

Source: Field Survey, 2019

Credit administration is a major source of financial institutions' revenue, hence management of loan default affects the profitability and sustenance of the bank (Afriyie and Akotey, 2013). Table 4.15 shows the combination of the credit risk management measures used by the rural banks in the region, client assessment criteria and rate of loan default. The Rural Banks defined Client Assessment Criteria as mandatory conditions that clients in the sector must meet before a loan request can be accepted. Most of the rural banks prefer clients to be account holders of the bank before a loan request will be accepted. Also, because of the risk associated with the agricultural sector, some banks prefer clients to be in groups so that the group members can guarantee repayment for each other.

Table 4.15 Rural Banks and Credit Risk Management Measures and Loan Default Rate

Rural Bank	Credit Risk Management Measures	Client Assessment Criteria	Loan Default Rate (%)
A	• Evaluation of repayment capacity • Collateral	• An account holder in the bank • Good credit history	-
B	• Evaluation of repayment capacity • Collateral • Diversification of loan portfolio	• Be in a farmer group • An account holder in the bank • Have collateral • Good credit history	5
C	• Evaluation of repayment capacity • Rationing • Diversification of loan portfolio • Credit Bureau	• An account holder in the bank • Be in a farmer group • Have collateral • Good credit history	35
D	• Evaluation of repayment capacity • Diversification of loan portfolio	• Be in a farmer group • An account holder in the bank • Good credit history	15
E	• Evaluation of repayment capacity • Collateral	• Be in a farmer group • An account holder in the bank • Be in a farmer group • Have collateral • Good credit history	-

Source: Field Survey, 2019.

All the Rural Banks use quite similar credit risk management measures but Rural Bank C use measures like Credit Rationing and Credit Bureaus in managing agricultural loan default. These measures are peculiar to only Rural Bank C which has the lowest loan default rate. According to Silesh, Nyikal and Wangia (2012) loan default is an indicator of the

performance of credit risk management measures. Based on this it can be deduced from the table that the credit risk management measures used by Rural Bank C are not effective because of the rate of loan default (35%) of the bank. Credit risk management measures implemented by Rural Bank D are performing better compared to Rural Bank C. Also, Rural Bank B compared to the other banks has the best measures in reducing agricultural loan default. The low rate of default of Rural Bank B (5%) could be attributed to the bank using the savings of the clients as security.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter recapitulates the highlights of the findings of the study and proposes solutions to tackle the problem of consistent decline in share of loan portfolio dedicated to agriculture.

5.2 Summary

The study sought to analyse credit risk management measures because, the loan portfolio to agriculture has been low and continues to decline as a result of the riskiness, perceived or real, of the sector. Hence, the following specific objectives were set. The first objective was set to examine the causes of loan default from the perspective of both lenders and borrowers. Loan default was defined in the study as delinquent loans. The next objective was to rank the causes of default identified by the rural banks and verify if there is an agreement among the rural banks regarding the causes of default discovered. The third objective was to identify risk management strategies that have been adopted by the rural banks in the region. The study found the most adopted and least adopted measures as well as innovative credit risk management measures the rural banks in the region adopted. The final research objective was to assess the effectiveness of credit risk management measures in preventing, mitigating or coping with the risk of agricultural loan default. Recommendations on how to mitigate the problem of declining agricultural loan portfolio are also provided.

For the first objective of the study, a logistic regression model was used to identify the causes of default. A binary logistic regression was used because of the dichotomous nature of the dependent variable of loan default. Ten dependent variables were found in literature to be potential causes of default. Five were identified to have significant effects on loan default. Size of farmer group and educated group executives have positive relation with loan default.

Farmers engaging in off-farm businesses, years of business relationship between farmer group and rural bank and loan monitoring by rural banks had negative relationship with loan default. This means that an increase in any of these variables decreases the likelihood of loan default. Being members of farmer group, educated group executives and farmers generating income from off-farm enterprises can be influenced by farmers. Loan monitoring is an exogenous factor; a determinant of loan default which is out of the control of the borrower. There was no significant relationship between groups with more married members, gender composition of the group, cultivating more than one predominant crop, groups with more than one religion, group liability lending and loan default.

A Likert procedure was used to discover that farmers diverting the loan for other purposes, bad weather and pest invasion which cause low farm yields, fluctuating market prices, inadequate information on credit history of borrower, poor loan supervision, farmers with limited collateral and delay in loan delivery were perceived by rural banks to be the causes of default in the Northern Region.

The factors of credit default were ranked and analysed to find an agreement among the rural banks regarding the causes of default predominant in the region. Using Kendall's test of Concordance, some degree of agreement was found among the rural banks regarding the causes of loan default. The highest ranked cause of default among the rural banks in the region is farmers diverting loans for other purposes. Other highly ranked causes of default are bad weather and pest invasion that affects harvest, falling/fluctuating market prices that affects profits and poor loan supervision by the rural banks. Different religions in a group was the least ranked cause of default in the Northern Region.

The result of the survey for the fourth objective showed that rural banks use both conventional and innovative measures. The credit risk management measures were classified as preventive, mitigative and coping measures. The most adopted measure is evaluating the

repayment capacity of clients. Accessing credit history of clients from credit bureaus was the least adopted strategy. Group lending is a common credit risk management strategy among the banks. This refers to when members of a farmer group are mutual guarantors of a loan.

The final objective was to assess the effectiveness of credit risk management measures the rural banks adopted using the Likert procedure. Evaluating the repayment capacity of clients and diversification of loan portfolio according to the rural banks, were the most effective of the measures adopted to manage loan default. Other measures are asset-backed lending, group lending, rationing and warehouse receipt financing.

5.3 Conclusions

The significant causes of agricultural loan default in the region are group size, educated group executives, farmers engaging in off-farm businesses, years of business relationship between farmer group and rural bank and lastly loan monitoring. The study concluded that to manage causes of default rural banks should focus on client related factors and proper loan monitoring.

From the lenders perspective, the identified causes of risk in the Northern Region were mainly loan diversion by farmers, bad weather and pest invasion which cause low farm yields, fluctuating market prices, inadequate credit history on farmers, poor loan supervision, farmers with limited collateral and delay in loan delivery by the banks. Most of these causes are factors that are characterised as institutional factors. This means that the rural banks can control these causes to prevent or mitigate loan default. Also, a significant level of agreement was found among the rural banks in the region regarding the causes of agricultural loan default. Farmers diverting loan for different purposes was the most prevalent cause of loan default among the rural banks in the region. This means that rural banks must investigate the credit history of the borrower before engaging with them.

Evaluating the repayment capacity of the borrower was the common measure rural banks adopted in the region. Also, this measure is selected by the rural banks to be the most effective measure. There are some similar causes of loan default from the perspective of the farmers and the rural banks. Most of these causes are either client-related or institutional-related. Hence, in curbing loan default rural banks should formulate strategies that focus on both client-related factors and endogenous factors. These were the findings made in regards to the research questions that were investigated in the study.

5.4 Recommendations

Based on the findings and conclusions of the study, the following recommendations are made to curtail the rate of loan default and this will boost Rural Banks' interest in lending to the sector. The rural banks should look out for the following favourable characteristics of a farmer group when lending: small-size farmer groups, groups with literate executives, farmer groups that have most of its membership engaging in off-farm enterprises, groups with experience in agricultural loan products because these characteristics tend to improve loan repayment. The banks can also support farmer groups to attain these characteristics through group formation and financial literacy training programmes. Rural banks should invest in data management technology and upgrade their Management Information System (MIS) to be more analytical to help identify important characteristics of clients associated with a high risk of agricultural loan default.

These recommendations outline ways to manage causes of agricultural loan default as perceived by the rural banks. To limit the diversion of loan for other commitments, efforts should be made to provide loans not in cash but in kind (issuing vouchers for inputs and other needs) to mitigate the cases of farmers diverting loans for personal use and unproductive purposes. It is suggested that the rural banks should give a revolving loan to farmers to reduce loan diversion and increase loan repayment rate. Credit officers should advise group

members not to use agricultural loans taken for any other purpose. Also, the consequences of diverting funds received for unproductive activities should be made known to farmers. Rural banks can also administer credit in parts, based on the needs of the farmers; for instance one part can be provided during seedbed preparation, other parts during individual stages in cultivation and the final part during harvesting; this is to reduce diversion of loans.

Loan officers should improve and intensify their loan supervision activities. Officers should have robust structures to monitor repayments regularly and take immediate counteractive measures on undesirable repayment observations. Also, monitoring of loan activities outside the office or field visits could be done at least on weekly basis instead of monthly or at the time of harvest.

Accurate marketing information is relevant to farmers and traders because fluctuating/falling prices of agricultural commodities can affect profits which can lead to loan default. Presently, the Ministry of Food and Agriculture announces market prices of commodities by location weekly, but this is not enough. It is recommended that the Ministry goes further to provide information on the volume of supply of commodity, the present and expected market demand, present and future price trends to the actors of the agricultural market. The farmers can also be linked to market information providers like Esoko for real-time prices.

Rural banks should also be encouraged to register with a robust Credit Bureau that will provide them with credible information on credit history of borrowers. A Credit Bureau is an agency that collects information on the credit history of an individual and sells it to financial institution. This measure can reduce the rate of loan default which is as a result of inadequate information on the credit history of farmers. In the survey only one rural bank adopted this measure.

In mitigating delay in loan disbursement, it is suggested that lending process must be reviewed often by the Bank of Ghana or the Apex Bank to reduce bureaucracies involved in approval and disbursement of agricultural credit. This will ensure timely loan disbursement and in tandem with weather patterns. Banks should develop insurance plans (for example group savings) to cushion the effect of loan default.

The government or non-governmental organisations should organise capacity building programmes for farmers on how to manage credit as well as curtail other endogenous causes of loan default such as large group size, illiterate group executives, loan diversion. Also, training programmes should be organised for financial institutions on how to develop appropriate credit risk management measures taking the causes of default in the area into consideration.

Evaluation and appraisal of the repayment capacity is the most adopted credit risk management measure. The development and applications of credit scoring systems in loan evaluation must be adopted in the credit risk management systems of rural banks. Credit scoring systems will factor in significant causes of credit defaults and make the loan appraisal systems robust. This will decrease the inherent risks associated with the approval of loans to clients in the agricultural sector.

Rural banks should modify their loan products available to the sector to encourage farmers who do not have access to the required collateral to apply for loans. Group lending is used by 60% of the rural banks but the regression analysis results showed an insignificant relationship with loan default. This method should be improved and used because of its success in other financial institutions that use this measure. Group lending and warehouse receipt financing are measures that have been used in countries like Ethiopia, South Africa and Uganda to mitigate loan default in areas farmers have limited or no collateral. Rural

Banks should be encouraged to join financial institutions supporting the Warehouse Receipt Finance model managed by the Ghana Commodities Exchange.

REFERENCES

Addae-Korankye, A. (2014). Causes and control of loan default/delinquency in microfinance institutions in Ghana. *American International Journal of Contemporary Research, 4*(12), 36-45.

Adedapo, K. D. (2007). Analysis of default risk of agricultural loan by some selected commercial banks in Osogbo, Osun State, Nigeria. *International Journal of Applied Agriculture and Apiculture Research, 4*(1&2), *24-29.*

Adito, S., Gan, C., & Nartea, G. V. (2012). Sources of risk and risk management strategies: the case of smallholder farmers in a developing economy. In: Banaitiene N. (ed.): Risk Management – Current Issues and Challenges.

Afolabi, J. A. (2010). Analysis of loan repayment among small scale farmers in Oyo State, Nigeria. *Journal of Social Sciences, 22*(2), 115-119.

Afriyie, H. O., & Akotey, J. O. (2013). Credit risk management and profitability of rural banks in the Brong Ahafo of Ghana. *European Journal of Business and Management, 5*, 24–35.

Agada, S. G., Iheanacho, A. C., & Ogbanje, E. C. (2018). Causes and measures for controlling loan default among Agricultural Cooperatives in Bune State, Nigeria. *International Journal of Environment, Agriculture and Biotechnology* (ISSN: 2456-1878).3(5), DOI: 1668-1672.10.22161/ijeab/3.5.12

AGRIFIN. (2015). *About Us: AGRIFIN*. Retrieved from AGRIFIN Web site: https://www.agrifinfacility.org/resource/warehouse-receipt-financing-experience-access-bank-madagascar

Al-Hassan R, Poulton C (2009). Agriculture and social protection in Ghana. Future Agricultures. Working Paper No. 009.

Amwayi, E. A., Omete, F. I., & Asakania, F. M. (2014). Analysis of group based loan default in Kenya: The case of Agricultural Finance Corporation of Kenya. *IOSR Journal of Economics and Finance*, *4*(2), 19-26.

Asiamah, J. (2018, December 7). *About Us: AfDB.* Retrieved from African Development Bank Web site: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/PANEL_III_Bank_of_Ghana_Supporting_Agrifinance_Dr._Johnson_Asiamah.pdf

ARB Apex Bank Ltd, 2017. *Annual Report 2017.* Retrieved from https://www.arbapexbank.com/

Auronen, L. (2003, May). Asymmetric information: theory and applications. In Seminar of Strategy and International Business as Helsinki University of Technology.

Awunyo-Vitor, D. (2012). Determinants of loan repayment default among farmers in Ghana. *Journal of Development and Agricultural Economics, 4*(13) 339-445.

Awunyo-Vitor, D., Mahama Al-Hassan, R., Bruce Sarpong, D., & Egyir, I. (2014). Agricultural credit rationing in Ghana: what do formal lenders look for? Agricultural Finance Review, 74(3), 364-378.

Ayanda, I. F., & Ogunsekan, O. (2012). Farmers' perception of repayment of loans obtained from Bank of Agriculture, Ogun state, Nigeria. *Journal of Agricultural Sciences, 3*(1), 21-27.

Ayogyam, A., Mohammed, H., Goddana, M. D., & Boateng, E. (2013). Monitoring loan repayment among farmers in Techiman, Ghana: investigating the effect of cooperative farming system. *Journal of Emerging Trends in Economics and Management Sciences, 5*(1), 32-37.

Bandyopadhyay, A. (2007). Credit risk models for managing bank's agricultural loan portfolio. National Institute of Bank Management, Pune, India MPRA Paper No. 5358, pp. 1-17

Bank of Ghana (2017). *Bank of Ghana Banking Sector Summary.* Accra.

Bank of Ghana (2018). *Bank of Ghana, Banking Sector Summary.* Accra.

Bank of Ghana (2019). *Bank of Ghana, Banking Sector Summary.* Accra .

Becerra, N., Fiebig, M., & Wisniwski, S. (2010). Agricultural production lending: A Toolkit for loan officers and loan portfolio managers. Eschborn, GTZ.

Besley, T., & Coate, S. (1995). Group lending, repayment incentives and social collateral. *Journal of Development Economics, 46*(1), 1-18.

Castro, C., & Garcia, K. (2014). Default risk in agricultural lending, the effects of commodity price volatility and climate. *Agricultural Finance Review, 74*(4), 501-521.

Chao-Béroff, R., (2014). Global dynamics in agricultural and rural economy, and its effects on rural finance. In Finance for Food: Towards New Agricultural and Rural Finance (pp. 3-21). Springer, Berlin, Heidelberg.

Cooke, E., Hague, S., & McKay, A. (2016). The Ghana poverty and inequality report: Using the 6th Ghana living standards survey. New York: UNICEF.

Coyle, B. (2000). Framework for Credit Risk Management, Chartered Institute of Bankers, United Kingdom

Dalberg, 2018. *The Economics of Agri-SME Lending in East Africa Final Report 2018.* Retrieved from:https://www.agrilinks.org/sites/default/files/resources/

Eze, C., & Ibekwe, U. (2007). Determinants of loan repayment under indigenous financial system in Southeast, Nigeria. *Medwells Journals*, *2*(2), 116-120.

Ghanadistricts.com. (2019, May 07). Retrieved from Ghana Districts Web site: http://www.ghanadistricts.com/Home/LinkData/7188

Gine, X., & Karlan, D. S. (2006). Group versus individual liability: A field experiment in the Philippines. Yale University Economic Growth Center working paper (940).

GSS. (2013). 2010 Population and housing census, regional analytical report Northern Region. Ghana Statistical Service.

Hamza, R. (2007). Non-Agricultural rural activities preliminary results from selected area of Syria. National Agricultural Policy Centre Working Paper, (28).

Hartarska, V., Nadolnyak, D., & Shen, X. (2015). Agricultural credit and economic growth in rural areas. *Agricultural Finance Review*, *75*(3), 302-312.

Hisaki, K. O. N. O. (2006). Is group lending a good enforcement scheme for achieving high repayment rates: evidence from field experiments in Vietnam, IDE Discussion Paper No.61.

Höllinger, F., Rutten, L., & Kiriakov, K. (2009). The use of warehouse receipt finance in agriculture in ECA countries. In: Technical background paper for the World Grain Forum (pp. 6-7).

Impavido, G. (1998). Credit rationing, group lending and optimal group size. *Annals of Public and Cooperative Economics*, *69*(2), 243-260.

International Finance Corporation. (2012). *Innovative agricultural SME finance models.* International Finance Corporation.

Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2015). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, *7*(4), 396.

Kamau, K. N. G. (2010). Major determinants of loan repayment in Small Scale Enterprises in Kariobangi Division, Nairobi County. Signature, 61, 63416.

Klein, B., Meyer, R., Hannig, A., Burnett, J., & Fiebig, M. (1999). Better practices in agricultural lending. Agricultural Finance Revisited (AFS) Series No. 3.Rome: Food

and Agriculture Organization of the United Nations (FAO), Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ).

Kloeppinger-Todd, R., & Sharma, M. (Eds.). (2010). Innovations in rural and agriculture finance. Focus 18, Brief 1-14. Washington DC:International Food Policy Research Institute.

Kodongo, O., & Kendi, L. G. (2013). Individual lending versus group lending: An evaluation with Kenya's microfinance data. *Review of Development Finance, 3*(2), 99-108.

Kothari, C. R. (2004). Research methodology: Methods and techniques. New Age International.New Delhi; New Age International Publishers.

Kwakye, J. K., (2012). *Financial intermediation and the cost of credit in Ghana*.Institute of Economic Affairs Monograph No.36, Accra.

Maurer, K. (2014). Where is the risk? Is agricultural banking really more difficult than other sectors? D. Köhn (ed.), In Finance for Food: Towards New Agricultural and Rural Finance (pp. 139-165). Springer, Berlin, Heidelberg.

Merrill III, H. J. (2017). Consequences of information asymmetry on corporate risk management. *Applied Economics Theses. 21*

Ministry of Food and Agriculture. (2017). *Agriculture in Ghana: Facts and figures (2016).* Statistics, Research and Information Directorate (SRID). MOFA.

Musima, B. (2012). *A Study on agricultural risk management strategies by the Agriculture Finance Corporation of Kenya.*

Nair, A., & Fissha, A. (2010). Rural banking: The case of rural and community banks in Ghana *Washington DC: World Bank.*

Nakornthab, D., & Suwan, C. N. (2006). Thailand's agricultural household debt: Assessment of recent trends. In *Communication lors de l'Asia-Pacific Economic Association Third Annual Conference*.

Nam, M. V., & Duy, V. Q. (2016). Determinants repayment performance of orrowers in rural Mekong Delta of Vietnam. *Asian Economic and Financial Review, 3*(1), 305-322.

Ofosu, G. (2018). Rural Banks. Bog.gov.gh. Retrieved 16 May 2019, from https://www.bog.gov.gh/supervision-a-regulation/register-of-licensed-institutions/rural-banks#

Oheneaku, V. K. (2017). Credit risk management in rural banks: a case of some selected rural bank institutions within the Ashanti Region of Ghana (Doctoral dissertation, University of Education Winneba).

Onumah, G. E. (2003). Improving access to rural finance through regulated warehouse receipt systems in Africa. *In United States Agency for International Development–World Council of Credit Unions conference on Paving the Way Forward for Rural Finance: An International Conference on Best Practices. Washington, DC, June*, (pp. 2-4).

Peck Christen, R., Pearce, D., Rubio, F., Acevedo, J. P., Brar, A., Ayee, G. & Reinsch, M. (2005). Managing risks and designing products for agricultural microfinance: Features of an emerging model. Occasional Paper No. 11. Consultative group to assist the poor. Washington, D.C.

Regions-Government of Ghana. (2019, May 7). Retrieved from Ghana.gov.gh: http://ghana.gov.gh/index.php/about-ghana/regions

Schaper, C., Lassen, B., & Theuvsen, L. (2010). Risk management in milk production: A study in five European countries. *Food Economics–Acta Agriculturae Scandinavica C, 7*(2-4), 56-68.

Semie, N., Belay, K., Karippai, R. S., & Bogale, A. (2009). Measurement of farmers' attitude towards complete ownership of farmland in Eastern Ethiopia. J*ournal of Rural Development/Nongchon-Gyeongje, 32*,111-131.

Sharma, M., & Zeller, M. (1997). Repayment performance in group-based credit programs in Bangladesh: An empirical analysis. *World Development, 25*(10), 1731-1742.

Sileshi, M., Nyikal, R., & Wangia, S. (2012). Factors affecting loan repayment performance of smallholder farmers in East Hararghe, Ethiopia. *Developing Country Studies, 2*(11), 205-213.

Singla, S., & Sagar, M. (2012). Integrated risk management in agriculture: an inductive research. *The Journal of Risk Finance, 13*(3), 199-214.

Sulewski, P., & Kłoczko-Gajewska, A. (2014). Farmers' risk perception, risk aversion and strategies to cope with production risk: an empirical study from Poland. *Studies in Agricultural Economics, 116*(3), 140-147.

Tambunlertchai, S. (2004). The Government's helping hand: A study of Thailand's Agricultural Debt Moratorium (Doctoral dissertation, Harvard University).

Udoh, E. J. (2008). Estimation of loan default among beneficiaries of a state government owned agricultural loan scheme, Nigeria. *Journal of Central European Agriculture*, *9*(2), 343-352.

Wenner, M. D. (2010). Credit risk management in financing agriculture (No. 18 (10)). International Food Policy Research Institute (IFPRI).

World Bank. (2005). Managing agricultural production risk. *Innovations in Developing.* Washington DC.

World Bank Open Data. (2018). Data.worldbank.org. Retrieved 8 May 2019, from https://data.worldbank.org/

Yeboah, E., & Oduro, I. M. (2018). Determinants of loan defaults in some selected credit unions in Kumasi Metropolis of Ghana. *Open Journal of Business and Management, 6*(03), 778.

Yegon, J. C., Kipkemboi, J., Kemboi, J. K., & Chelimo, K. K. (2014). Determinants of seasonal loan default among beneficiaries of a state owned agricultural loan scheme in Uasin Gishu County, Kenya. *Journal of Emerging Trends in Economics and Management Sciences*, *5*(1), 51-55.

Yehuala, S. (2008). Determinants of smallholder farmers' access to formal credit: the case of Metema Woreda, North Gondar, Ethiopia. North Gondar: MSc. Thesis: Haramaya University.

Yerby, W. O. N. (1977). A review of institutional agricultural credit in Ghana with special reference to loan repayment problems. Iowa State University, Department of Economics.

Zeller, M. (1998). Determinants of repayment performance in credit groups: The role of program design, intragroup risk pooling, and social cohesion. *Economic Development and Cultural Change*, *46*(3), 599-620.

APPENDICES

Appendix 1-Questionnaire for Rural Banks

University of Ghana

Department of Agricultural Economics and Agribusiness

Questionnaire for Rural Banks

I am Gabriel Selasie Agbedohu, an MPhil Agribusiness student at the University of Ghana and I am doing a research on Credit Risk Management Strategies in Agricultural Lending in partial fulfilment of a Master of Philosophy degree in Agribusiness. This questionnaire seeks to collect relevant information from you to analysis credit risk management in agricultural lending. This is purely an academic exercise hence information taken will be used in confidence and not for any other purpose without the consent of the respondents.

Date: **District:** **Institution:**

Personal Data

1. What is your present position in the institution? ……
2. How long have you been working in the banking industry?

   1-5 yrs ☐ 6-10 yrs ☐ 11-15 yrs ☐ 16-20 yrs ☐ 21+ yrs ☐
3. What is your professional background? ……..

Loans

4. What financial service products are available? .....
5. How long does it take to forward process and approve an agricultural loan?

   ……
6. What is the minimum and maximum short-term agricultural loan amount?

   ……..
7. What is the minimum and maximum long-term agricultural loan amount?

   ……...
8. What is the interest rate on a short-term agricultural loan? ……..
9. What is the interest rate on a long-term agricultural loan? ……..
10. What is the loan repayment time for a short-term agricultural loan? ……..
11. What is the loan repayment time for a long-term agricultural loan? …….
12. What is the share of agricultural loans in the financial institution's loan portfolio?

    …….
13. Is there any loan follow-up and monitoring by the bank?Yes☐ No☐

14. How frequent are follow-ups on loans for supervision? .....

15. How many credit officers are in the bank? …….....

16. How many credit officers are assigned to agricultural loans? .....

17. What is the required minimum qualification of credit officers?

……..

18. How many agricultural credit officers have qualification in agriculture?

……..

Causes of Credit Risk

Select and rank the factors listed, based on your perception of the factors that mostly causes agricultural loan default in your institution.

Causes of Loan Default	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
Client-related					
1. Different religions in a group	1	2	3	4	5
2. Young and inexperienced farmer group	1	2	3	4	5
3. Mixed-sex group	1	2	3	4	5
4. Farmers with limited collateral	1	2	3	4	5
5. Farmers perceiving loans as giveaways or handouts	1	2	3	4	5
6. Uneducated group executives	1	2	3	4	5
7. Farmers diverting loans for other purposes	1	2	3	4	5
8. Farmers not engaging in off-farm businesses	1	2	3	4	5
Market and Production-related					
9. Undue state interference in the agricultural sector	1	2	3	4	5
10. Falling/Fluctuating market prices of agricultural products	1	2	3	4	5
11. Bad weather and pest invasion causing low farm yields	1	2	3	4	5
Causes of Loan Default	**Strongly Disagree 1**	**Disagree 2**	**Neutral 3**	**Agree 4**	**Strongly Agree 5**
12. Farmers diverting loans for other purposes	1	2	3	4	5
Institutional-related					
13. Inadequate information on credit history of borrower	1	2	3	4	5
14. High interest charged by banks	1	2	3	4	5

on loans					
15. Poor loan supervision by financial institution	1	2	3	4	5
16. Delay in loan delivery by financial institution	1	2	3	4	5

Credit Risk Management Measures

1. On a scale of 1 to 10, how do you prioritise agricultural loans in your bank? .....
2. What credit risk management strategies are used for:

a. Prevention of loan default

Evaluate repayment capacity of lender☐ Rationing☐

Margin on interest rate for risk☐ Others…….....

b. Mitigation of loan default

Collateral☐Diversification of loan portfolio ☐

Other…….

c. Coping with loan default

Loan loss provisioning ☐ Other…….

3. What innovative credit risk management strategies have been adopted for agricultural lending? Group lending ☐Warehouse receipt system☐ Value-Chain financing☐

Collateral management☐ Out-grower schemes☐

Other ……

4. What are the client assessment criteria of the financial institution?

Be in a farmer group☐ Must be an account holder in the bank☐

Have collateral☐ Have good credit history☐ Educated☐

Other ……

5. What are the constraints or challenges of the credit risk management strategies used by the institution?

Strategy	Challenge
1.	
2.	
3.	

4.	
Other	

Effectiveness of Credit Risk Strategies

For each of the following statement, circle the response that indicates your level of agreement to the effectiveness of the credit risk management measures by choosing 1-Very ineffective, 2-Ineffective, 3-Neutral, 4-Effective, 5-Very Effective.

Credit Risk Management Strategies	Very Ineffective	Ineffective	Neutral	Effective	Very Effective
Credit Evaluation/Appraisal system	1	2	3	4	5
Use of collateral	1	2	3	4	5
Rationing	1	2	3	4	5
Diversification of loan portfolio	1	2	3	4	5
Group lending	1	2	3	4	5
Warehouse receipt system	1	2	3	4	5
Out-Grower schemes	1	2	3	4	5

For Credit Managers

Causes of Credit Risk

Select and rank the causes listed, based on the determinant that mostly causes agricultural loan default in your institution.

Causes of Loan Default	Yes/No	Rank
Client-related		
1. Different religions in a group		
2. Young and inexperienced farmer group		
3. Mixed-sex group		
4. Borrowers with many dependents (big household size)		
5. Farmers with limited collateral		
6. Farmers perceiving loans as giveaways or handouts		
7. Uneducated group executives		
Market and Production-related		
8. Undue state interference in the agricultural sector		
9. Falling/Fluctuating market prices of agricultural products		
10. Bad weather and pest invasion causing low farm yields		
11. Farmers diverting loans for other purposes		
12. Low returns/profit from farm-enterprise		

13. Farmers not engaging in off-farm businesses		
Institutional-related		
14. Inadequate information on credit history of borrower		
15. High interest charged by banks on loans		
16. Poor loan supervision by financial institution		
17. Delay in loan delivery by financial institution		
18. Financial institutions do not educate clients on loan usage		

Appendix 2- Questionnaire for Farmer Group

University of Ghana

Department of Agricultural Economics and Agribusiness

Questionnaire for Farmer Group

I am Gabriel Selasie Agbedohu, an MPhil Agribusiness student at the University of Ghana and I am doing a research on 'Credit Risk Management Strategies in Agricultural Lending' in partial fulfilment of a Master of Philosophy degree in Agribusiness. This questionnaire seeks to collect relevant information that will help identify the causes of loan default from the farmer's perspective. This is purely an academic exercise hence information taken will be used in confidence and not for any other purpose without the consent of the respondents.

Date: **District:**

Name of FBO: **Community:**

Client Information

1. How old is the group? 1-5yrs☐ 6-10yrs☐ 10yrs +☐
2. Is the group a registered cooperative? Yes☐ No☐
3. What is the size of the group?

   1-10☐ 11-20☐ 21-30☐ 31-40☐ 41+☐
4. How many group members are married? ……
5. What is the gender composition of the group?

   Male ☐ Female ☐ Mixed ☐
6. What is the religious composition of the group? One religion☐ More than one ☐
7. What is the average age of farmers in the group? ……..
8. Are the group executives educated? Yes☐ No☐
9. If yes, what is the educational level of group executives?

a. Chairman: None☐ Basic☐ Secondary☐ Tertiary☐

b. Secretary: None☐ Basic☐ Secondary☐ Tertiary☐

c. Treasurer: None☐ Basic☐ Secondary☐ Tertiary☐

Production-related information

10. How many predominant crops are cultivated by the group members?

    One☐ More than one☐
11. What are the predominant crops grown by the group?

    Cash crops: ……

Staples crops: ……

12. What is the average farming experience of group members?

    1-5yrs☐ 6-10yrs☐ 10yrs +☐

13. What percentage of members are involved in off-farm businesses?

    0-50%☐ above 50%☐

14. Does group monitor usage of loan by members? Yes☐ No☐

15. Who is held liable when there is credit default? Group☐ Individual☐

Facility information

16. Which financial institution does the group deal with? .....

17. What is the length of relationship between the group and the bank? ……

18. What financial service does group obtain from financial institution?

    Savings☐ Loans☐ Money transfer☐ Insurance☐

19. How many times has the group borrowed from the bank?

    Once☐ Twice☐ Three times and more☐

20. What is the lowest loan amount administered to group? …….

    Year …….. Interest rate ……

21. What is the largest loan amount administered to group? ……..

    Year …….. Interest rate ……

Short-term Loans

22. What is the interest rate charged on the last loan received and in which year?

    Interest rate …….. Year …….

23. What is the loan repayment time for last loan received?

    ……...

24. What is the time of loan disbursement?

    Before planting season☐ During planting season☐ After planting season☐

25. How long did it take for the financial institution to process the last loan? ……

Long-term loans

26. What is the interest rate charged on the last loan received and in which year?

    Interest rate …….. Year …….

27. What is the loan repayment time for last loan received?

    ……

28. What is the time of loan disbursement?

    Before planting season☐ During planting season☐ After planting season☐

29. How long does it usually take for the financial institution to process your loan?

    ……..

30. Does the financial institution monitor how the group uses loans? Yes☐No☐

31. If yes, how? …….

32. What are the challenges of the group in repaying loans?

    …….....

33. Has group been given any financial literacy training before? Yes☐ No☐

34. Does group give loan usage training to members? Yes☐ No☐

35. What is the financial institution's requirement from group for approving loans?

    Collateral☐, Type of Collateral……..

    Saving with the bank ☐ Cooperative Certificate☐ Credit History ☐

    Group members must be jointly liable to default☐

36. What are the known risk farmers face in the community

    Disease and pest infestation☐ Unstable prices of farm produce☐

    Other……..

37. Has the group borrowed from a financial institution before? Yes☐ No☐

38. If yes, has the group defaulted before? Yes☐ No☐

Appendix 3: Output of Logistic Regression in SPSS

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	Size of the group (members)	.089	.039	5.249	1	.022	1.093	1.013	1.179
	Groups with more than 50% of members married	-15.452	28420.722	.000	1	1.000	.000	.000	.
	Female group			1.681	2	.431			
	Male group	.005	1.272	.000	1	.997	1.005	.083	12.157
	Mixed group	-1.772	1.613	1.207	1	.272	.170	.007	4.013
	Groups with more than one religions	2.307	2.066	1.247	1	.264	10.042	.175	575.838
	Educated group executives	4.968	1.736	8.195	1	.004	143.774	4.791	4314.693
	Cultivating more than one predominant crop	1.917	1.134	2.858	1	.091	6.801	.737	62.786
	Farmer groups with more 50% of members involved in off-farm businesses	-3.769	1.808	4.347	1	.037	.023	.001	.798
	Group liability lending	-.751	.986	.581	1	.446	.472	.068	3.257
	Length of relationship between group and the bank	-.426	.165	6.720	1	.010	.653	.473	.901
	Financial institutions monitoring loan usage	-4.011	1.246	10.360	1	.001	.018	.002	.208
	Constant	-.993	3.155	.099	1	.753	.371		

Appendix 4: Output for Kendall's Coefficient of Concordance

Ranks

Causes of Default	Mean Rank
Different religions in a group	14.40
Young and inexperienced farmer group	13.70
Mixed sex group	14.40
Size of Group	13.10
Farmers with limited collateral	7.70
Farmers perceiving loans as give away or handout	6.30
Uneducated group executives	7.90
Undue state interference in the agricultural sector	5.10
Falling fluctuating market prices of agriculture commodities	4.80
Bad weather and pest invasion causing low yields	4.40
Farmers diverting loans for other purposes	4.00
Farmers not engaging in off farm businesses	12.10
Inadequate information on credit history of borrowers	6.40
High interest charged by banks	10.10
Poor loan supervision by financial institution	4.80
Delay in loan delivery by financial institution	6.80

Test Statistics

N	5
Kendall's W[a]	.729
Chi-Square	54.690
df	15
Asymp. Sig.	.000

a. Kendall's Coefficient of Concordance