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# **A Survey of Credit Risk Measurement and Management of Agricultural Financing in Uganda**



**Master of Business Administration**

**2016**

# **A Survey of Credit Risk Measurement and Management of Agricultural Financing in Uganda**

**Brian Okot Lukwiya**

**Submitted in partial fulfillment of the requirement for the  
Degree of Master of Business Administration at  
Strathmore University**

**Strathmore Business School  
Strathmore University**

**Nairobi, Kenya**



**May, 2016**

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Brian Okot Lukwiya

MBA/76841/13

.....  
25<sup>th</sup> May 2016

## Approval

The thesis of Brian Okot Lukwiya was reviewed and approved by the following:

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## Abstract

The agricultural sector has been identified as key enabler of economic growth and development in Africa. It is the largest employer in sub-Saharan Africa. Governments, Non-Government Organizations (NGOs), multi-lateral organizations, and companies have made concerted efforts to invest in the sector to drive economic growth, profitability and improved standards of living. Extension of credit to the agricultural sector would contribute towards the growth in the industry.

Financing agriculture is considered riskier than other sectors in the economy, which has resulted in several institutions avoiding the sector or investing reservedly. Agricultural clients are perceived to be at higher risk of default because of the uncertainty inherent in the sector. Studies have been done on general risks affecting agriculture ranging from systemic to idiosyncratic. This study was a qualitative research focused on credit risk because it is a key indicator financial institutions consider before disbursing loans. It explored how credit risk in the agricultural sector is managed and evaluated, the sufficiency of the current tools, processes and systems, and the innovative methods being implemented by financial institutions to resolve the challenge of credit risk.

The survey was carried out of selected banking and non banking financial institutions with major agricultural loan portfolios in Kampala, Uganda. The results show that financial institutions employ conventional risk models and risk management measures in agricultural finance, although a few are innovating with different approaches to managing agricultural risk such as value chain financing and financial literacy training for borrowers. Such innovative solutions were found to be effective in managing risk, thereby enhancing extension of credit to agricultural sector.

The study recommends adoption of a holistic approach to measurement and mitigation of risk in the agricultural sector. Responsibility for managing credit risk cannot be borne solely by the financial institutions. An integrated model of measuring and mitigating risk from the production to the market stage, with financial intermediaries as key enablers of the process, would be successful and eventually lead to expansion of credit to the agricultural sector.

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## Abbreviations and Acronyms

AGRA	Alliance for Green Revolution in Africa
BCBS	Basel Committee on Banking Supervision
BOU	Bank of Uganda
BPS	Budget Policy Statement
CAADP	Comprehensive Africa Agriculture Development Program
CBK	Central Bank of Kenya
DFI	Development Financial Institution
FSD	Financial Sector Deepening
GDP	Gross Domestic Product
GPFI	Global Partnership for Financial Inclusion
MDG	Millennium Development Goals
MDI	Microcredit Deposit Taking Institution
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFPRI	International Food Policy Research Institute
MFI	Microfinance Institution
MDGs	Millennium Development Goals
MSME	Micro, Small and Medium Enterprise
NGO	Non-Governmental Organization
NPL	Non-Performing Loans
SACCO	Savings and Credit Cooperative
SME	Small and Medium Enterprise
UBOS	Uganda Bureau of Statistics

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## Dedication

I dedicate this dissertation to my family: my mother who taught me the importance of hard work, integrity and persistence, and my brother Micky and sisters Lorna, Fiona and Annet who helped shaped my values and character.



# **CHAPTER ONE: INTRODUCTION TO THE STUDY**

## **1.1 Background**

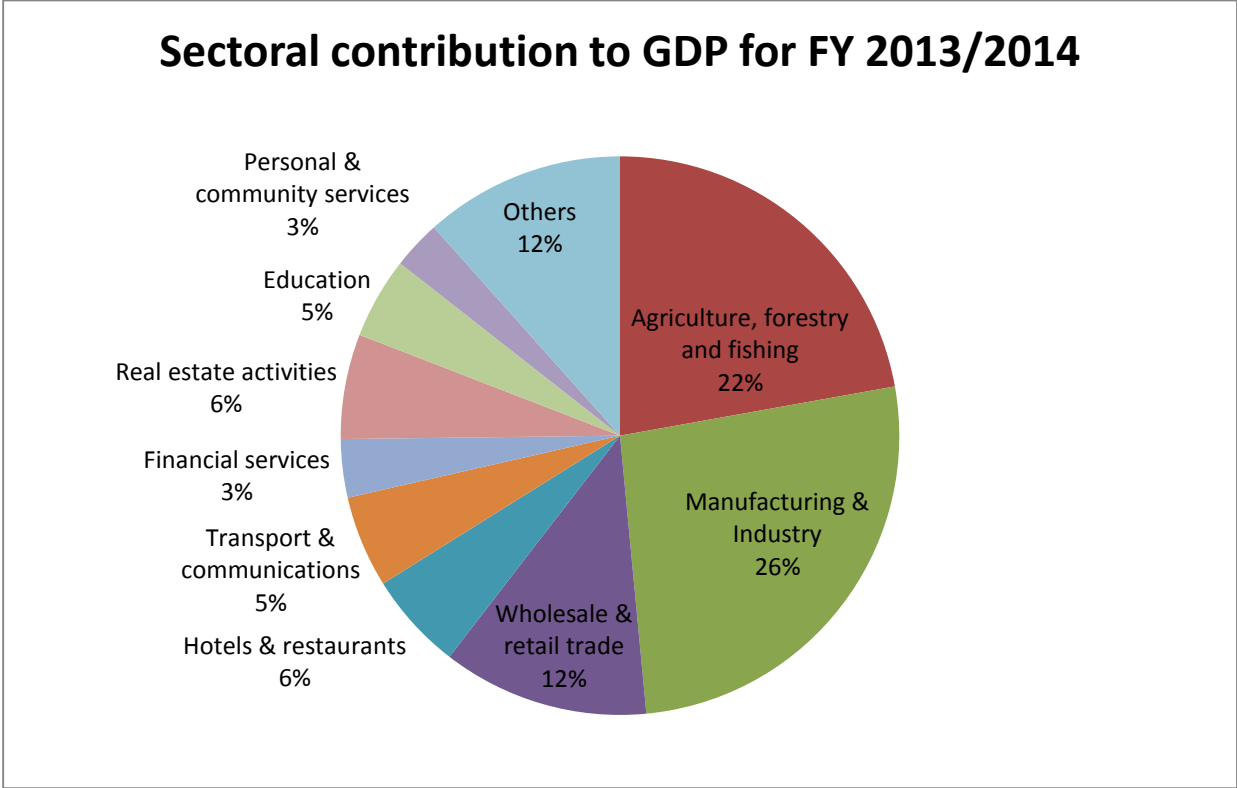
The surge in food prices over recent years has brought renewed attention to the issue of agricultural finance, especially for underserved agricultural Small and Medium Enterprises (SMEs) and smallholder farmers. A report by the International Finance Corporation (IFC) [2011] showed that in low-income countries, agriculture accounts for 60% of total employment and 20% of GDP. The importance of agriculture, especially to the economies of developing countries, cannot be overstated.

A seven country research by the International Food Policy Research Institute (IFPRI) [2011] found that agriculture-led growth consistently led to greater poverty reduction than non-agricultural sector growth. A report by International Finance Corporation (IFC) pointed out that 75% of the developing world lives in rural areas, and about nine out of every ten depend upon agriculture for their livelihoods (IFC, 2012). Agricultural investment is often regarded as one of the most efficient and effective ways to promote food security and reduce poverty, with some studies demonstrating a four-fold reduction in poverty over other sectors.

To underscore the significance of agricultural development to the stability and prosperity of African states, African Governments under the auspices of the African Union signed the Maputo Declaration in 2003 that ushered in the Comprehensive Africa Agriculture Development Program (CAADP), which calls for signatories to invest at least 10% of their annual budgets in agriculture in order to achieve an average of 6% annual growth rate in the agricultural sector. However, to date very few countries have complied. Uganda's expenditure on the agricultural sector under the Medium Term Expenditure Framework (MTEF) stands at 3% of Gross Domestic Product (GDP) for FY 2014/2015 and FY 2015/2016 (National Budget Framework Paper [NBFP], 2015). The agriculture, forestry and fishing sector contributed 22% to Uganda's real output of Uganda shillings 25.20 trillion in 2014, which is the third largest contribution by any sector to the economy. Agriculture, along with mining, oil and gas, and tourism have been identified as key development opportunities in Uganda's Vision 2040.

The World Economic Outlook (WEO) Update, April 2015 projected global economic growth to be 3.5% in 2015, up from 3.4% in 2014, with more positive prospects for advanced economies, while growth in emerging and developing economies is projected to be lower. The major forces affecting global output include demographic factors such as declining population on advanced economies, legacies of the financial and Euro crises, low inflation below targets, decline in long term bond yields, falling oil prices, currency fluctuations, and geopolitical tension (WEO, 2015). The real GDP of the Uganda economy grew by 4.7% in 2014, which decreased from 6% in 2013. This was weaker than the 5.7% growth projected for Financial Year 2014. GDP growth was driven by final consumption expenditure and capital formation (BOU annual report, 2014).

Figure 1.1: Sectoral Contribution to GDP in FY 2014



Source: Uganda Bureau of Statistics

As shown in Figure 1, agriculture, forestry and fishing sector contributed the third largest share towards the country's GDP, after services and industry. The Government has identified the agricultural sector as one of the three sectors to deliver economic growth but the sector still faces serious challenges. These include: unfavorable climate, poor planning and inadequate warning systems, low production and productivity, poor marketing and infrastructure, low value addition and competitiveness, inadequate physical infrastructure, unfavorable legal and policy frameworks, low access to financial services and affordable credit (MOFPED, 2015).

The agriculture sector expanded by 1.5% in FY 2014 compared with 1.3% growth in FY 2013. This growth was driven by an increase in food crop production, which grew by 0.2% in FY 2014. In the same period, both industry and service sectors grew by 5.6%. The services sector was the dominant sector contributing 45% of total output, followed by industry at 26% and agriculture at 22% (BOU annual report, 2014).

Figure 1.2: Sectoral distribution of private sector credit (June 2011 to June 2014)

Sector	Private sector credit							
	UGX billions				(Percent of total)			
	Jun-11	Jun-12	Jun-13	Jun-14	Jun-11	Jun-12	Jun-13	Jun-14
Agriculture	449.4	490.2	626	872.9	6.7%	6.5%	7.8%	9.6%
Mining and Quarrying	19.7	31.5	27.8	22.3	0.3%	0.4%	0.3%	0.2%
Manufacturing	921.8	1005.7	1119.6	1207.3	13.7%	13.4%	14.0%	13.2%
Trade	1519.5	1695.5	1688.3	1971.3	22.5%	22.6%	21.1%	21.6%
Transport & Communication	518.6	490.8	461.4	489	7.7%	6.5%	5.8%	5.4%
Electricity & Water	61.1	74.5	112.5	107.7	0.9%	1.0%	1.4%	1.2%
Building and Construction	1352.7	1707.6	1805.8	2068.5	20.1%	22.8%	22.6%	22.7%
Business Services	292.1	269.7	412.8	399.6	4.3%	3.6%	5.2%	4.4%
Community & Other Services	223	263	251.9	300.6	3.3%	3.5%	3.1%	3.3%
Personal & Household Loans	1067.6	1150.1	1091.2	1566.7	15.8%	15.3%	13.6%	17.2%
Other Services	317.9	324.1	406.3	124.7	4.7%	4.3%	5.1%	1.4%
<b>Total</b>	<b>6743.4</b>	<b>7502.7</b>	<b>8003.6</b>	<b>9130.6</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Source: BOU annual report, 2014

Private sector credit grew by 14.1% in 2014 compared to 6.4% in 2013. This growth was as a result of improved economic conditions in the country. As shown in Figure 2, the agricultural sector attracts very low amounts of private sector credit at 9.6% in 2014. This is despite 70% of the population being employed in agriculture mainly as small holder farmers. The building and construction sector, trade, and personal and household sectors attracted the bulk of private sector credit, which together total up to 61.5% of private sector credit.

The Financial Stability Report (FSR) reported the ratio of Non-Performing Loans (NPLs) to total gross loans during the year to June 2014 increased by 1.4% to 5.8% in June 2013. The trade and commerce sector was the largest contributor to non-performing loans, accounting for 24.7% of the total, building and construction came in second at 22.8%. Both attracted more credit than the agricultural sector which accounted for 9.8% of NPLs (BOU, 2014). However, these sectors still attract higher private sector credit from financial institutions, despite higher loan defaults. This indicates misallocation of capital within the economic sectors.

The Government of Uganda set up the Agricultural Credit Facility (ACF) in 2009 in partnership with commercial banks, Uganda Development Bank, Credit Institutions and Microcredit Deposit-taking Institutions (MDIs) to extend credit to the agricultural sector on more favorable terms. Under the program, the Government provides 50% of the loan amount and the participating institution provides 50%. As at June 2014, the facility had extended loans worth Ushs 162.5 billion to borrowers (BOU, 2014). Other major financial institutions lending to the agricultural sector include Development Finance Company of Uganda (DFCU) bank through its agribusiness loan product, Stanbic bank, Equity Bank, Pride Microfinance and FINCA Uganda.

However, the non-banking financial institutions lack the scale and reach of commercial banks to effectively serve the sector. Additionally, the MDIs collect lower deposits from clients compared to banks and incur high operating and transactions costs. This has resulted in inefficiencies in the sector, making it more costly to serve borrowers in the agricultural sector, further stunting growth in agricultural finance.

Bangladesh Rehabilitation Assistance Committee (BRAC) has reported repayment rates of over 98% of small loans in Bangladesh primarily in agriculture, and repayment rate of 100% of small loans in Uganda out of a total of USD 14.8 million disbursed to 2,145 village organizations consisting of 59,844 members (“Brac\_(NGO),” n.d) Similarly, Grameen bank which extends microfinance to rural borrowers by 1999 had a repayment rate of over 98% (Yunus and Jolis, 1999). Both organizations target the rural under-served population widely regarded as too risky or unprofitable by mainstream financial institutions, and most borrowers were victims of predatory lending.

## **1.2 Problem Statement**

Credit financial providers consider farming very risky, the distance to the farm makes the appraisal process very difficult and stringent regulations in the requirement of collateral as major constraints in providing credit financial services to the smallholder farmers (Kiplimo, 2013). Weber and Musshoff (2012) stated that the biggest challenges for banks and commercial Microfinance institutions that inhibit lending to rural Micro, Small and Medium Enterprises (MSMEs) are high transaction costs and dealing with agricultural specific credit risks. Kaaya and Pastory (2013) found a negative correlation between credit risk indicators and bank performance, which indicate that the higher the credit risk the lower the bank performance.

Access to rural financial services has the potential to make a difference in agricultural productivity, food security and poverty reduction (Kibaara, 2006). The agricultural sector, however, continues to attract very little funding from the financial sector at only 9.6%. Furthermore, the challenges to providing financial services to the agriculture sector multiply significantly as financial institutions move from larger farmers and high value chains to smallholder farmers and lower value crops, particularly subsistence food crops. Weber and Musshoff (2012) found that agricultural clients of Access Bank, Tanzania had a lower probability of receiving a loan than non-agricultural clients, which is in line with most of the empirical literature on agricultural credit rationing. This is despite the fact that agricultural clients reported lower delinquencies than the non-agricultural clients.

A study of a commercial bank in Tanzania found that credit risk management systems differ in banks operating in less developed countries than from those operating in a developed economy which implies that the environment within which the bank operates is a determinant of whether or not the credit risk management system will succeed (Richard, Chijoriga, Kaijage, Peterson, & Bohman, 2008).

The purpose of this research therefore is to examine how banks and MDIs in Kampala, Uganda, appraise and manage the risk of default on agricultural loans given the unique challenges, opportunities and risks the agricultural sector presents. The study further seeks to propose ways in which credit risk management in the agricultural sector may be enhanced to mitigate the risk of default.

### **1.3 Research Objectives**

The purpose of this study is to investigate credit risk measurement and agricultural lending.

- i. To analyze credit risk measurement to agricultural financing by selected banks and MDIs in Uganda
- ii. To evaluate the effectiveness of risk mitigation measures currently available to agricultural finance in Uganda
- iii. To identify measures which may be taken to enhance credit risk management to agricultural finance in Uganda

### **1.4 Research Questions**

- i. How is credit risk measured for disbursement of agricultural loans by banks and MDIs in Uganda?
- ii. How effective are the risk mitigation measures currently applied to manage credit risk in agricultural finance in Uganda?
- iii. What measures may be taken to enhance credit risk management to agricultural finance in Uganda?

### **1.5 Scope of the Study**

There are currently twenty-five (25) licensed commercial banks, three (3) credit institutions and three (3) deposit taking microfinance institutions in Uganda regulated by the Bank of Uganda. Out of these, eight (8) financial institutions formed the scope of the study, including five (5) banks and three (3) MDIs. These institutions have various branches throughout the country. However, emphasis was at the various branch headquarters in Kampala where policy decisions are made.

### **1.6 Significance of the Study**

Countries stand to reap the benefits of investment in the agricultural sector through reduction in poverty, food security, and employment. Such investment can be done through extending credit to farmers and agribusinesses. Furthermore, financial institutions have hitherto avoided lending to the agricultural sector because of the high systemic and independent risks. Most financial institutions apply similar credit risk measurement and management tools across all sectors without taking into consideration the unique challenges the agricultural sector faces.

This study therefore seeks to determine how the various stakeholders in the agricultural industry namely; the Government of Uganda, farmers, agribusinesses, financial institutions, NGOs, scholars and the public at large may devise sector-specific tools for credit risk management in the agricultural sector. The results of the study will assist in financial inclusion of small holder farmers. This will boost productivity which will help ensure food security, reduction in rural poverty, increased employment and could be used by policy makers for national development. Banking and non-banking financial institutions will benefit from improved risk management techniques and reduce non-performing loans in the agricultural sector increasing their profitability.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter reviews existing literature on agricultural risk specifically those that may contribute to default and currently available risk management tools in use by various lenders. It explores various challenges related to credit risk that lenders must navigate to extend credit to the agricultural sector. It further reviews theoretical literature on agricultural risk measurement and management to develop a deeper understanding of the study, evaluates the efficacy of the current risk management tools used by various lenders, and finally, identifies research gaps that this study seeks to address.

### **2.2 Role of Credit and Credit Risk**

Credit is the trust which allows one party to provide resources to another where that second party does not repay immediately but arranges to return the resources at a later date ("Credit (finance)," n.d). It encompasses several forms, not necessarily money. Enterprises use credit to acquire productivity-enhancing assets. Rural enterprises in developing economies, however, often lack access to the credit they need. Key reasons for this lack of access include the low level and scattered nature of economic activity in rural areas, the enterprises' lack of collateral, inadequate capacity among the country's lenders to lend in rural areas, and legal and policy environments that discourage lending to rural enterprises (Nair & Kloeppinger-Todd, 2006).

The need for agricultural commodities grows as populations grow and adopt dietary habits that demand higher protein content and higher quality foods for emerging middle classes in urbanizing populations (IFC, 2012). The total value of all agricultural activities in the world increased by more than a third from 2002 to 2010 to reach US Dollars 7,043 billion. With agricultural demand estimated to grow 50% by 2030, the world's 450 million smallholder farms will play an increasing role in food provision. Highly organized value chains with strong buyers such as food processors, distributors, and commodity traders have emerged in many markets and can help to secure lending to those farmers supplying to these buyers. However, the vast majority of farmers in emerging economies are outside these high-value supply chains.

The Basel Committee on Banking Supervision (BCBS) defines credit risk as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms (Basel Committee on Banking Supervision, 2000). Duffie and Singleton (2012) define credit risk as the risk of default or of reductions in market value caused by changes in the credit quality of issuers or counterparties. CBK defines credit risk as “the current or prospective risk to earnings and capital arising from an obligor’s failure to meet the terms of any contract with the bank or if an obligor otherwise fails to perform as agreed” (CBK 2013, p16). Credit risk therefore includes both default risk and the risk of credit deterioration. Credit risk is generally considered to be higher for loans to agriculture because of the inherently high level of risk the sector itself faces. For most institutions, the loans they extend are the biggest cause of credit risk. However, this risk is prevalent in other activities of the bank such as the banking and trading books (CBK, 2013). Practically, financial institutions use the six-Cs to evaluate credit applications: character, capacity, collateral, condition, credit history and capital.

Excess credit risk has been known to be a major contributor to bank failures. Some of the symptoms of excess credit risk include high non-performing loans, high growth in asset base, insufficient risk pricing, high correlations between loans (different type of loans and NPL), absorption of risk above bank’s technical capacity, and over optimistic categorization of customers during credit risk analysis of customer applications. Godlewski (2005) states that one of the ways of reducing credit risk is for banks to decide which economic sectors are less risky and therefore increase its loan book size in that sector. At the same time reduce the loan book size in the more risky sectors through portfolio balance. Failure to have portfolio balance has been captured as a characteristic of excess credit risk exposure in the financial industry (as cited in Olili, 2011).

A study of Access Bank Tanzania Limited, a commercial MFI reveal that agricultural firms face higher obstacles to get credit, but as soon as they have access to credit, their loans are not differently volume rationed than those of non-agricultural firms. Furthermore, agricultural firms are less often delinquent when paying back their loans than non-agricultural firms. The authors suggest that lending to agricultural firms must

not necessarily lead to higher credit risk if the risk exposure of agricultural firms is addressed adequately by the lender. However, even if the authors show that access to credit and loan repayment is different for agricultural firms, the current regional focus of the MFIs only allows for lending to agricultural firms in the greater Dar es Salaam area. Thus, these results might change in a rural setting or in different country contexts (Weber & Musshoff, 2012).

### **2.3 Credit Risk Measurement and Management**

Richard, Chijoriga, Kaijage, Peterson and Bohman (2008) categorize commercial bank risk into three; financial risk with credit risk being a component of it, operational and strategic risk. Credit risk is the most severe and likely cause of bank failures. Therefore, a weakness in credit risk management is reported to be the major cause of bank failures. Banks in developing economies use several tools to control credit losses such as covenants, collateral, credit rationing, loan securitization and syndication. Hiring of high quality staff in credit risk management is integral in ensuring the entire system runs as designed.

The Basel Committee in Switzerland has introduced voluntary standards to be implemented by Central Banks around the world that ensure stability of financial institutions and proper management of risk. Basel II guidelines set out in 1999 were established with the aim to; guarantee a more risk sensitive allocation of capital; improve the efficiency and transparency of markets; provide common guidelines for the management of risk and; reduce regulatory arbitrage among countries. Basel II is built on three pillars; minimum capital requirements which defines the detailed capital requirements for market, credit and operational risk; supervisory review which provides a framework for dealing with systemic, pension, concentration, strategic and liquidity risks; and market discipline which aims at making markets more efficient and transparent (“International regulatory framework,” 2013).

Basel III was introduced in 2013, after flaws were noted in Basel II during the financial crisis, most notably that Basel II gave banks too much freedom in computing quantities such as probability of default and it introduces too much rigidity in the way banks hedged risks. Basel III was introduced with the aim of: improving the banking sector’s

ability to absorb shock from financial or economic stress; improve risk management and governance, and strengthen bank's transparency and disclosure. Basel III introduced new rules covering; capital definitions and requirements; capital conservation buffer; countercyclical buffer; leverage ratio; liquidity risk; and counterparty credit risk. These should improve bank supervision and resilience of individual banking institutions through strengthening bank capital requirements by increasing liquidity and decreasing leverage ("International regulatory framework," 2013).

The World Bank conducted a survey of 15 financial institutions in five African and Asian countries to understand how these institutions manage their credit risk. The survey found that the absence of well functioning national identification and credit information systems limited the ability of all 15 financial institutions to assess their clients' credit-worthiness. None of those that made small loans used traditional forms of collateral or conventional credit assessment systems, in which the approval decision is based on the detailed financial analysis of an individual applicant or project. Some of the financial institutions used simplified financial analysis, in which the applicant's capacity to successfully undertake an activity is assessed based entirely on cash flows. Others used parametric, area-based scales that were standardized to fit certain crops in a given geographical area. Some required evidence of land ownership, but without requiring mortgage or any other form of collateral. (World Bank; AFRACA; FAO; Land Bank of South Africa, 2009).

The findings of the review suggest that all financial institutions interested in starting or scaling up lending to smallholder farmers and small rural enterprises should consider: innovative means, such as biometrics, for uniquely identifying clients; alternatives to traditional financial analysis, such as the use of cash flows rather than balance sheets; alternatives to traditional forms of collateral, such as tripartite arrangements and group lending; and developing agricultural expertise at credit officer and senior management levels. Agriculture financing risks are broadly categorized into three: agricultural production and includes natural factors, such as weather, pests, diseases, and market factors, such as the price of seeds, fertilizers, and pesticides; risk relates to the farmer and his or her well-being; and risk relating to financial institutions and their capacity and

the regulatory environments in which they operate. Risk management instruments are required in all three categories which include a range of insurance products, price risk management tools, good banking practices and business advisory services, market facilitation, and certification services to increase market access. The report noted that fostering financial literacy can also contribute to more effective risk management. This would increase repayment rates. Additionally, appropriate commercial and financial regulations can mitigate risk that results from policy uncertainty (World Bank; AFRACA; FAO; Land Bank of South Africa, 2009).

#### **2.4 Theoretical Literature on Agricultural Credit Risk Management**

Value-at-risk (VaR) is a common risk assessment tool used to calculate probability of default. It can be used to estimate both market and credit risk. Katchova and Barry (2005) conducted a study to develop credit risk models that meet capital requirements for agricultural lenders under the New Basel II Capital Accords to be implemented in 2006. The credit risk models were based on Merton's option pricing approach and credit VaR methods. Their conclusions were that the necessary capital for agricultural lenders varied substantially depending on the riskiness of the portfolio among others. However, Taleb (2007) has criticized the VaR approach and use of normal distribution for their failure to predict consequential rare events owing to their very nature of having small probabilities. These are events considered extreme outliers, but have a much larger impact than smaller regular occurrences. Such weather events like typhoons and prolonged droughts affect the agricultural sector.

Options and futures contracts are the principal instruments that enable agents to manage price risk. These instruments help financial institutions to improve their risk assessment capabilities and their credit monitoring. However, regulatory restrictions -- the relatively high unit cost of transactions involving options and futures contracts, and the limited capacity of most value chain actors to enter into such transactions -- have limited the use of these instruments by institutions that lend to agriculture sector agents. These factors have limited their use in lending to smallholder farmers, in particular (World Bank; AFRACA; FAO; Land Bank of South Africa, 2009). Hedging is also not an

ideal insulator from risk due to risks such as basis risk and production risk among others. These serve to reduce their uptake in practice (Just & Pope, 2003).

## **2.5 Gap in the Existing Literature**

A number of studies have been done on general risks facing the agricultural sector and risk management techniques to offset these risks (Cotter, Dowd and Morgan, 2012; OECD, 2009; Kibaara and Nyoro, 2007; Christen and Pearce, 2006). However, no specific study has been conducted to study credit risk and its management in the agricultural sector in Uganda. Furthermore, from the research reviewed, it cannot be determined whether the available credit risk management tools are adequate or applicable to meet the unique needs of the agricultural sector especially due to the high unpredictability of the sector's performance.

Other studies focus on access to credit from the perspective of the borrower (Weber and Musshoff, 2012; Kibaara, 2006). This study sought to investigate the provision of credit from the perspective of the lender. It investigated how lenders approached credit risk measurement and management in the agricultural sector.

The studies in the literature view indicated that the agricultural sector was underserved because the industry was considered more risky than other sectors like construction and trade. However, this perception may be erroneous hence further study is required to why this perception exists and how it can be improved upon. Improving on the management of credit risk in the agricultural industry would improve incomes and profitability, expand financial inclusion, increase credit access, and create a strong linkage between the agricultural and financial services industries resulting in robust growth in the economy.

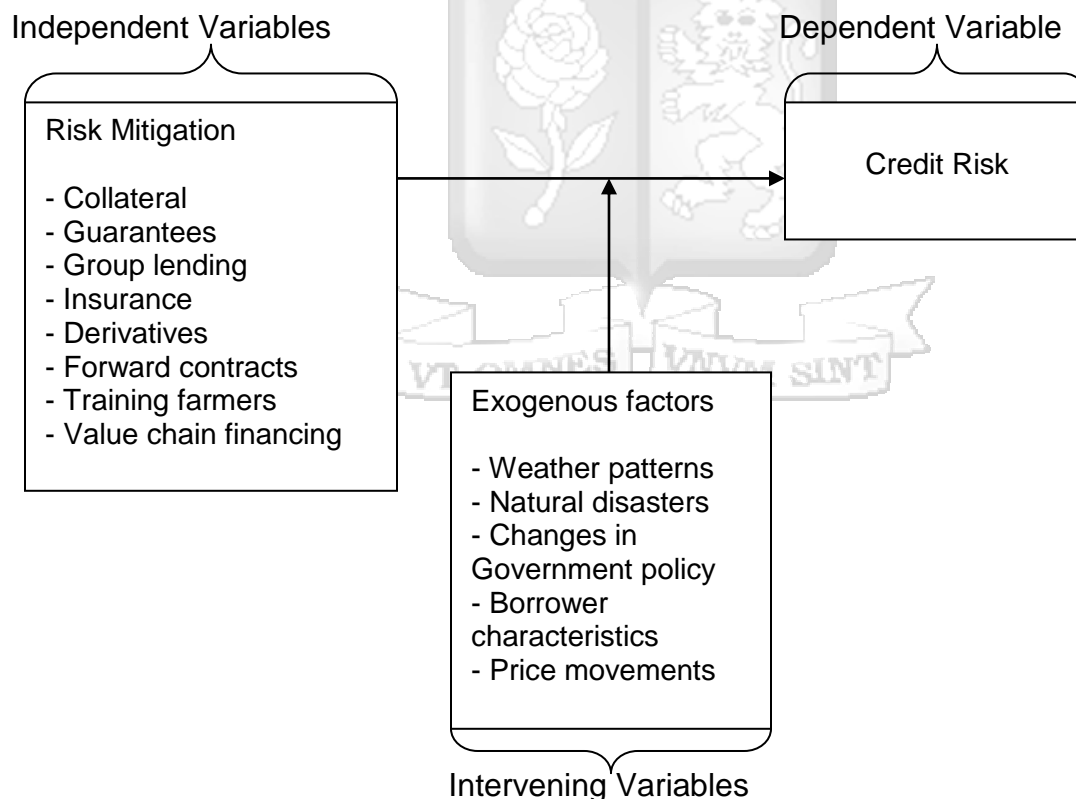
## 2.6 Conceptual Model

This section formulates a conceptual model that summarizes the literature review. It defines the independent and dependent variables, and the relationship between them.

Independent variables – these include the risk mitigation measures that are undertaken to reduce credit default in financial institutions.

Intervening variables – these include exogenous factors that may affect that the risk of default. Some may be idiosyncratic while others may be systemic.

Dependent variable – credit risk, which is the risk of default on agricultural loans, is the dependent variable. It will be measured using the Non Performing Loans (NPL) ratio which is the most readily available public indicator of loan default rates



Source: Author (2016)

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter consists of the research design and sampling techniques. It further describes the data collection methods, data analysis and how the quality of the research was maintained. It ends with the ethical issues considered in the study.

### **3.2 Research Design**

This study was a survey of credit risk measurement and management of agricultural lending. The study collected both quantitative and qualitative data to answer the research objectives using a Questionnaire filled in by Risk, Audit, Credit and Operations Managers and/or officers at the financial institutions to solicit their professional opinions and those of other professionals in the financial services industry. Additionally, one-on-one interviews were carried out with select Managers from the institutions. Secondary data was gathered from Bank of Uganda surveys and reports, and other relevant, reliable data from the Ministry of finance, planning and economic development, and Uganda Bureau of Statistics.

### **3.3 Population and Sampling**

The unit of analysis was the financial institution. The research was conducted to obtain the perspective of experienced managers in credit risk. The respondents were unable to provide credit information on borrowers for further quantitative analysis because of data confidentiality and fear of prosecution. The population of banking and non-banking financial institutions consists of twenty five commercial banks, four deposit taking micro-credit institutions and four credit institutions. A sample was drawn from both banking and non banking financial institutions. The sample size was selected using purposive sampling, with emphasis on institutions lending to the agricultural sector. The institutions included the following: Standard Chartered, Stanbic Bank, DFCU Bank, Barclays Bank, Uganda Finance Trust Bank, Guaranty Trust Bank, Pride Microfinance and FINCA Microfinance. The research was directed towards individuals involved in the credit/risk process such as the decider on who gets the loans or the policy maker/manager such as the Head of Credit.

### **3.4 Data Collection Methods**

Both primary data and secondary data were required for this study. Primary data was collected using structured and non-disguised type questionnaire from officials working with the financial institution and semi structured interviews with selected Managers from the institutions. Secondary data was collected to provide further insight into to the study. Data sources included annual reports, independent studies on financial institutions and borrowers, and Bank of Uganda and Ministry of finance, planning and economic development published reports plus those of other Government agencies in the financial services sector. Data collected included methods of measuring credit risk, reasons for loan default, risk mitigation techniques and procedures.

### **3.5 Data Analysis**

Descriptive statistics such as percentages, frequencies, measures of central tendency such as mean, measures of dispersion such as standard deviations and coefficients of variation were used to analyze the data. Data findings were presented using bar graphs and frequency tables. This analysis was aided by Statistical Package for the Social Sciences (SPSS) and Excel to conduct tests on the data such as tests for significant relationships and differences. This was used to present and analyze findings related to all the three research questions. Qualitative data was analyzed using the content analysis method.

### **3.6 Research Quality**

The researcher ensured reliability, validity and objectivity of the study. To that end, the questionnaires were pre-tested with at least ten (10) respondents before data collection to ensure the questionnaires were easy to answer and collected the relevant data. One hundred percent checks were done on the questionnaires prior to data entry. The researcher reduced the researcher bias as much as possible. Two Research Assistants were used to distribute the questionnaires while interviews were conducted by the researcher.

### **3.7 Ethical Issues in Research**

The research upheld the important principle of research which is to do no harm to the subjects. Since this study was concerned with money which is a sensitive topic to most

people and institutions, maximum anonymity and confidentiality was maintained. To ensure cooperation the researcher explained the study benefits to the respondents without overstating them, explained to the participants their rights to privacy and protection, ensured informed consent and avoided any harm to participants.

DiCicco-Bloom and Crabtree (2006) consider four ethical issues during the interview process: reducing the risk of anticipated harm; protecting the interviewee's information; effectively informing the interviewee about the nature of the study; and reducing the risk of exploitation. Accordingly, the research ensured that no pain, discomfort, embarrassment or loss of privacy befell any of the respondents. The interviews were conducted at comfortable and convenient locations for the respondents, most of them at meeting rooms at their offices. The interviewees were informed of how long the interview would take and whether or not s/he would be okay with it. Interviews did not exceed an hour in all cases. The interviewee had the right to end the interview once s/he felt uncomfortable, although none of them ended the interview mid-way. The names of the interviewee were not disclosed to ensure anonymity and confidentiality.

The anonymity of the respondents was protected. The questionnaire did not include respondents' names or any other information that may be used to identify them. The researcher treated the respondents with fairness, respect and dignity.

The research abided by the rules of responsibility, accountability, liability and due process. The researcher ensured that the rights and welfare of the participants were protected. It ensured accuracy of the research outcomes and the protection of intellectual property rights and trade secrets. The process ensured that all stakeholders drew maximum benefit and no harm from research. The study was straightforward and as such deception was not be required. There were no identifiable cases that presented the researcher with an ethical dilemma.

## CHAPTER FOUR: PRESENTATION OF THE RESEARCH FINDINGS

### 4.1 Introduction

This chapter presents the findings of the study and is based on the objectives which were: to analyze credit risk measurement in agricultural lending, to evaluate the effectiveness of risk management tools currently available to agricultural finance and to identify best practice measures to enhance credit risk management in agricultural finance.

### 4.2 Analysis of credit risk measurement to agricultural lending

This section presents data and analysis in response to the first research objective. Respondents were asked through interview and questionnaire to respond to questions regarding credit risk measurement to agricultural finance in their organizations.

#### 4.2.1 Distribution of loans extended by financial institutions

The distribution of loans extended by the selected financial institutions was analyzed to determine which groups received the largest share of finance.

Table 4.1: Loan products provided

Loans	Frequency	Percent
SME loans	23	29.9
Personal or household loans	21	27.2
Group loans	15	19.5
Corporate loans	13	16.9
Others	5	6.5
Total	<b>77</b>	<b>100</b>

The loans provided included SME loans (29.9%), personal or house loans (27.3%), group loans (19.5%) and corporate loans (16.9%). The banks preferred extending conventional loans to SMEs and personal loans because their business and risk models were built to serve customers around such models. The MDIs preferred to extend group loans to clients as they considered them less risky.

#### 4.2.2 Sectoral distribution of loans extended by financial institutions

This section presents data on the sectoral distribution of loans by the financial institutions.

Table 4.2: Major sectors which benefitted from the loans

	<b>Frequency</b>	<b>Percent</b>
Wholesale and Retail	26	21.1
Agriculture	22	18.8
Manufacturing	21	17.1
Building and construction	20	16.3
Transport and communication	19	15.4
Tourism, education services	15	12.2
<b>Total</b>	<b>123</b>	<b>100</b>

The agriculture sector came in second at 18.8%. This could be attributed to Government intervention to extend credit to the agriculture sector through the Agriculture Credit Facility which is in partnership with commercial banks and the Bank of Uganda. Under this partnership, the Government provides 50% of the funds for the loan while the bank provides the other 50%. Further to that, the institutions selected were biased towards those lending to the agricultural sector as a major part of their loan portfolio.

#### 4.2.3 Analysis of determination of credit risk measurement to agricultural lending

In analyzing the credit risk measurement to agricultural lending, descriptive statistics were generated from a likert scale questionnaire with values close to one indicating high levels of agreement and values close to 5 depicting low levels of agreement with the statements. The low standard deviations were an indication of low levels of deviation in their levels of agreement among the respondents. The following results were obtained.

Table 4.3: Descriptive statistic credit risk measurement in agricultural lending

<b>Credit risk measurement variables</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Loans to the agricultural sector are riskier than loans to other sectors	31	1.00	5.00	1.9355	1.09348
Agricultural clients have higher default rates than non-agricultural clients	31	1.00	5.00	2.5161	1.23480
Agricultural loans maturing over one year have higher default than short term loans maturing in less than a year	31	1.00	5.00	2.0968	1.16490
Agricultural loans on average attract higher interest rates than non-agricultural loans because they are riskier	31	1.00	5.00	2.6129	1.30837
Valid N (listwise)	31				

The results in the table above indicated that loans to the agricultural sector are considered riskier than loans to other sectors as indicated by a low mean value of 1.9355 and a standard deviation of 1.09348. However, this perspective deviates from Bank of Uganda indicators that show that the agricultural sector scores lower percentage in non-performing loans than the services or construction sectors. This bias may be curtailing the expansion of credit to agricultural borrowers.

#### 4.2.4 Causes of default of agricultural loans

Table 4.4: Major causes of default in agricultural loans

<b>Cause</b>	<b>Frequency</b>	<b>Percent</b>
Weather changes	25	31.6
Price fluctuations	18	22.8
Production problems such as pests and diseases	16	20.3
Inadequate monitoring of clients	9	11.4
Information Asymmetry	7	8.9
Fraud	3	3.8
Others	1	1.2
<b>Total</b>	<b>79</b>	<b>100</b>

From the results in the results in the table above, the most common causes of default in agricultural loans included; weather changes (31.6%), price fluctuations (22.8%), production problems such as pests and diseases (20.3%), inadequate monitoring of clients (11.4%), information asymmetry (8.9%) and fraud (3.8%). In the context of this study, it can be said that most risks associated with agricultural loans are associated with natural calamities because majority of the farmers still depend on natural conditions rather than scientific methods for production.

#### 4.2.5 Reasons for rejection of agricultural loan applications by financial institutions

This section presents responses provided by the respondents on the key reasons why they rejected agricultural loan applications.

Table 4.5: Major reasons for rejection of applications for agricultural loans in your institution

Reasons	Frequency	Percent
Inconsistent cashflows or incomes	23	34
Unavailable or insufficient collateral	16	24
Agricultural clients are inherently riskier than other clients	11	17
Poor credit rating of agricultural borrowers	8	12
Higher transaction costs in serving agricultural/rural clients	4	6
Poor background of borrower such as limited education, financial illiteracy, etc	3	5
Others (poor previous loan track record)	1	2
<b>Total</b>	<b>66</b>	<b>100</b>

The major reasons for rejection of applications for agricultural loans in financial institutions were ranked as follows: inconsistent cashflows or incomes, unavailable or insufficient collateral and agricultural clients considered being inherently riskier than other clients. Inconsistent cashflows are largely caused by the unpredictability of weather which dictates the quality and quantity of the output of the farmers. However, agricultural clients may be said to be suffering from a perception bias.

#### 4.2.6 Models applied by organizations to measure agricultural credit risk

Table 4.6: Models the organization employs to measure credit risk

Models	SBU	SCB	DFCU	BAR	GTB	FTB	Pride	Finca	Total
Credit reference bureau	√	√	√	√	√	√	√	√	8
Credit portfolio view	√		√	√		√		√	5
The Five Cs	√	√	√		√	√	√	√	7
Stress testing	√				√				2
Scenario analysis								√	1
Ratings based approach	√				√				2
Financial statement analysis	√	√	√	√	√	√	√	√	8
Value at Risk	√			√		√			3
Sensitivity analysis	√			√					2
Equity based approach	√								1
Others (default ratios, qualitative approach)		√							1

The different models for measuring credit risk and their usage frequency showed that use of credit reference bureau and financial statement analysis were the most preferred. However, this locks out small borrowers who are not registered at the credit reference bureau. This could be for a number of reasons such as lack of legal documentation. Additionally, financial statement analysis favors legally registered businesses that can prepare audited financial statements and locks out the sole proprietors and farmers. The results also show a heavy reliance on traditional risk management measures by the financial institutions.

### 4.3 Evaluation of effectiveness of risk management tools and procedures currently available to agricultural finance

This section presents data in response to the second objective. In evaluating the effectiveness of risk management tools currently available to agricultural finance descriptive statistics were generated from a likert scale questionnaire with 1 indicating strongly agree, 2 for agree, 3 for neither agree nor disagree, 4 for disagree and 5 for strongly disagree. In the table below, the mean values close to 1 was an indication of high levels of agreement with the statement and mean values close to 5 were an indication of high levels of disagreement with the statement. The results obtained were as follows:

Table 4.7: Effectiveness of risk monitoring and control procedures currently available to agricultural finance

<b>Descriptive Statistics</b>					
<b>Risk Management Tools</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
The Board of Directors has effective oversight of the credit risk management strategy	31	1.00	5.00	2.0323	1.13970
The Board of Directors regularly review policies and procedures to ensure that proper credit controls and risk management processes have been put in place	31	1.00	5.00	1.8387	1.00322
The organization has comprehensive documented policies and procedures in place to manage the credit risk arising from the lending activities	31	1.00	5.00	1.6129	.98919
The organization is fully compliant with the Central Bank's Risk Management Guidelines	31	1.00	3.00	1.4839	.62562
The organizational processes ensure enhanced due diligence for customers and transactions identified as presenting a heightened risk of default	31	1.00	5.00	1.8387	.93441
The organization has sufficient employees in the risk and/or credit department to perform their assignments effectively	31	1.00	5.00	2.0000	1.09545

The organization has in place robust and comprehensive training policies and procedures to equip risk/credit department staff with appropriate skills to perform their assignments	31	1.00	5.00	1.7742	.99028
The nature, frequency and effectiveness of independent reviews and audits of the credit portfolio and the credit process are adequate	31	1.00	5.00	1.8065	1.04624
The organization has a robust and effective enterprise risk data infrastructure in place	31	1.00	5.00	2.1613	1.21372
The Organization has put in place a real time information system to keep track of the risk environment and respond adequately	31	1.00	5.00	1.9355	.99785
Consistent and diligent monitoring of agricultural loans can lower loan default of agricultural clients	31	1.00	5.00	1.8065	1.13782

From the results in the table above, most respondents agreed with the statement that the Board of Directors of their respective organizations had effective oversight of the credit risk management strategy given a mean value of 2.0323 and a standard deviation of 1.13970. In addition, majority of respondents agreed with the statement that the Board of Directors regularly reviewed policies and procedures to ensure that proper credit controls and risk management processes have been put in place as indicated by a low mean value of 1.8387 and a standard deviation of 1.00322. Through an interview with one board member of one of the microfinance organizations, it was revealed that credit policy reviews were done at quarterly board meetings. The Board of Directors regularly reviewed policies and procedures to ensure that proper credit controls and risk management processes have been put in place. Participation of the Board of Directors was found to be affective because that set the tone for the rest of the organization.

The results further indicated that most respondents reported that their organizations had comprehensively documented policies and procedures in place to manage the credit risk arising from the lending activities as indicated by a low mean value of 1.6129 and a standard deviation of 0.98919. The organization were fully compliant with the Central

Bank's Risk Management Guidelines (mean value= 1.4839 and standard deviation = 0.62562). This was in addition to ensuring due diligence for customers and transactions identified as presenting a heightened risk using Know Your Customer procedures. Compliance with risk management guidelines shows adherence to best practices in risk management which translate to lower risk of default.

Majority of respondents revealed that their organizations had sufficient employees in the risk and/or credit department to perform their assignments effectively as supported by a mean value of 2.0000 and a standard deviation of 1.09545 and a standard deviation of 1.09545. Through interviews with some senior managers, it was revealed that in addition to having employees with relevant qualifications, they also had employee development programs and trainings which covered credit and risk management.

The results also indicated that most respondents stated that their organizations had in place robust and comprehensive training policies and procedures to equip risk/credit department staff with appropriate skills to perform their assignments as indicated by a low mean value of 1.7742 and standard deviation of 0.99028.

The remaining mean values all indicate that respondents stated that the nature, frequency and effectiveness of independent reviews and audits of the credit portfolio and the credit process were adequate for their organization (mean value =1.8065) and they also had a robust and effective enterprise risk data infrastructure in place (mean value =2.1613). In addition, their organizations had put in place a real time information system to keep track of the risk environment and respond adequately.

Lastly, respondents strongly agreed that consistent and diligent monitoring of agricultural loans could lower loan default of agricultural clients as indicated by a mean value of 1.8065.

### 4.3.1 Assessment of risk mitigation models used by financial institutions

The following is the ranking of the credit risk mitigation measures in agriculture taken by the stated organizations.

Table 4.8: Risk mitigation models

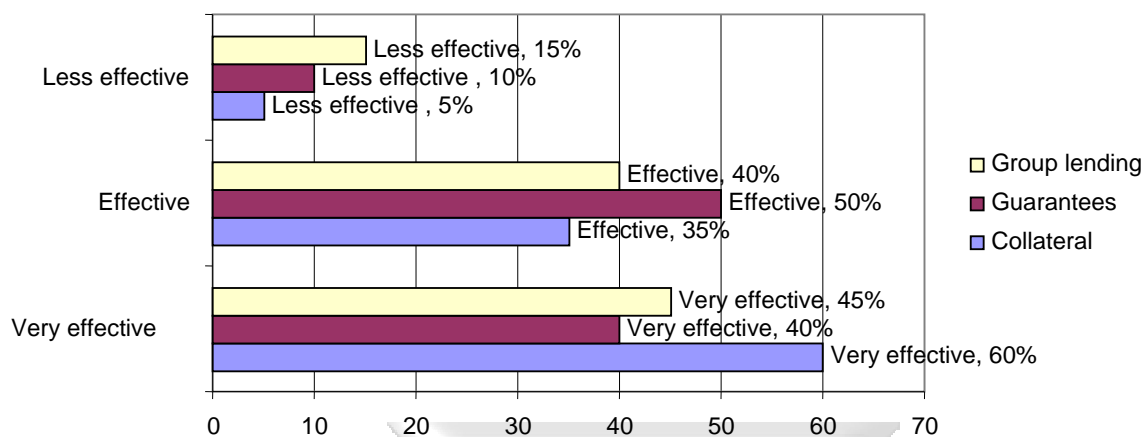
Methods	SBU	SCB	DFCU	BAR	GTB	FTB	Pride	Finca	Total
Collateral	√	√	√	√	√	√	√	√	8
Guarantees	√	√	√	√	√	√	√	√	8
Training farmers	√					√		√	3
Group lending			√				√	√	3
Crop or multi-peril insurance			√			√			2
Livestock insurance	√								1
Financing the entire value chain	√								1
Weather-index based insurance								√	1
Forward contracts (contract farmers)	√								1
Derivatives				√					1

The above rankings were an indication that collateral and guarantees are the most preferred methods of risk mitigation by the selected financial institutions. This indicates that the institutions still rely on conventional means of risk mitigation for the agricultural sector. They are hesitant to take up more flexible and innovative methods of risk mitigation such as forward contracts, value chain financing and agricultural insurance among others.

However, in discussions with Credit and Risk managers, they stated that collateral and guarantees were not risk-free methods much as they were they most preferred. They are prone to fraud by borrowers who submit fraudulent documents and internal fraud in certain cases.

### 4.3.2 Effectiveness of risk mitigation measures used by financial institutions

Figure 4.1: Effectiveness of the risk mitigation measures



From the chart above, the most effective risk measures were collateral security, group lending and use of guarantees. Other risk mitigation measures were reported to be not as effective.

### 4.3.3 Challenges faced in the implementation of credit risk management policies by financial institutions

Table 4.9: Major challenges faced in the implementation of credit risk management policies for agricultural loans at your institution

Challenges	Frequency	Percent
Difficulty in quantifying risk	24	31.6
Timeliness and quality of information	15	19.6
Calculation of parameters	7	9.2
Limited knowledge and skills within the organization	6	7.8
High cost of implementing the policies	5	6.6
Difficulty integrating risk management with other business processes	5	6.6
Constraints due to Information Technology	4	5.3
Information asymmetry	10	13.3
<b>Total</b>	<b>76</b>	<b>100</b>

All the items listed in Table 4.9 were acknowledged to be challenges faced in the implementation of Credit Risk Management policies for agricultural loans at credit institution with most common ones being difficulty in quantifying risk ranking first and then timeliness and quality of information. Credit Managers reported that gathering quality, reliable information is difficult because borrowers usually falsify information in order to acquire loans. This leads to decision makers acting on wrong information. Some institutions have introduced measures to verify information such as doing background checks. These additional measures however are costly and such costs are pushed on to customers in form of higher interest rates.

The other challenges which include information asymmetry, calculation of parameters, limited knowledge and skills within the organization, high cost of implementing the policies and difficulty integrating risk with management with other business processes are internal process challenges unique to every institution. These challenges are each resolved through their internal management processes.

#### **4.4 Measures to enhance credit risk management in agricultural finance**

In assessing which measures may be taken to enhance credit risk management in agricultural finance, the ranking was an indication of preference and effectiveness. Measures were ranked as follows: collateral security (27.7%), use of guarantees (25.3%), training farmers (13.3%), group lending (9.6%), crop or multi-peril insurance (8.4%), livestock insurance (4.8%). Collateral was the most convenient and consistently used risk management measure used. However, measures such as crop and livestock insurance were still new services in the market and therefore not widely understood or used. Group lending was used mainly by microfinance companies because most banks did not have such products on offer. Training farmers was also mainly done by microfinance companies and not commercial banks. Derivative products for hedging agriculture risk were not widely available which explains the low uptake on the market.

## **CHAPTER FIVE: DISCUSSION OF THE FINDINGS**

### **5.1 Introduction**

The discussion of results of the study brings out how the current findings are either in agreement or disagreement with authors of previous studies and how they respond to the research objectives.

### **5.2 Analysis of credit risk measurement in agricultural lending**

Through interviews with one credit officer at Pride Micro-Finance, it was revealed that the higher risk levels of agricultural loans were attributed to high dependence on natural conditions for agricultural products which cannot be predicted leading to seasonal variations in output. He explained that during good periods, performance / production can be good and the reverse is true. Hence the productivity of the sector heavily depended on external factors especially weather due to poor mechanization or automation of farms. Although agricultural clients were also said to have higher default rates than non-agricultural clients, Weber & Musshoff (2012) suggest that lending to agricultural firms must not necessarily lead to higher credit risk if the risk exposure of agricultural firms is addressed adequately by the lender.

The agricultural clients were also perceived as having higher default rates than non-agricultural clients given a mean value of 2.5161 which was the second highest value and standard deviation of 1.23480. The high default rates were attributed to poor performance of the agricultural sector and associated low and variable returns. This perception of higher default rates contradicts findings by Weber & Musshoff (2012) who assert that agricultural firms face higher obstacles to get credit, but as soon as they have access to credit, they are less delinquent than non-agricultural firms when paying back their loans.

Majority of the respondents agreed with the statement that loans maturing over one year have higher default than short term loans maturing in less than a year as indicated by a low mean value of 2.0968 and a standard deviation of 1.16490. In addition, loans maturing over one year were reported to have higher default than short term loans maturing in less than a year and for the case of agricultural loans, they on average

attracted higher interest rates than non-agricultural loans because they are riskier as indicated by a low mean value of 2.6129 and standard deviation of 1.30837. Based on the stated results, it was shown that loans to the agricultural sector particularly for food crops which are typically harvested in less than a year should have lower interest rates. However, this wasn't the case as agricultural loans were still associated with high risk levels.

Further, the results indicated that agricultural loans on average attracted higher interest rates than non-agricultural loans because they are perceived to be riskier as indicated by a mean value of 2.6129 which was higher than all other observations and standard deviation of 1.30837. This was because the lenders factored in higher risk in the agricultural loans which was passed on to the borrower in form of higher loan interest. Further to that, poor understanding of the agricultural sector and inefficiencies in risk management and operations could be the cause of higher interest rates to agricultural borrowers.

Majority of the clients do not use scientific farming methods which exposes them to the swings in the weather patterns. Farmers that relied on modern farming methods such as greenhouse farming and irrigation were less prone to inconsistent output and subsequently had more stable cashflows. High transaction costs was not a major problem for lenders because of innovations in the financial services industry particularly agency banking and mobile banking. This development contradicts findings by Weber and Musshoff (2012) that cite high transaction costs and agriculture specific credit risks as key inhibitors of agricultural finance.

The findings show that financial institutions use the same credit models for all sectors across the board. This proves that they have not taken into account the unique needs of the agricultural sector in designing their credit models. During an interview with the Agricultural Manager at Stanbic, he stated that the agricultural loans need to be structured to take into account the uneven cashflows and risk. This would substantially reduce the risk of default. The top four measures used to measure credit risk cannot be easily applied to smallholder farmers who may not have registered businesses to

prepare financial statements, may not have a credit rating or lack collateral. This effectively locks them out of the financial system.

Nevertheless, through interviews with some credit officers, it was reported that cash flows were commonly used because they indicate the ability of the borrower to repay the loan and enable the lenders structure the loan repayments to match the borrowers' cashflows which lowers the risk of default. This contradicts the views of Katchova and Barry (2005) who assert that Value-at-risk (VaR) is a common risk assessment tool used to calculate probability of default.

### **5.3 Evaluation of effectiveness of risk management tools and procedures currently available to agricultural finance**

During an interview with a Manager at one of the banks, he reported that collateral is still the most popular loan mitigation measure required for loan disbursement. Further, he reported that even with the Agriculture Credit Facility provided by the Government through Bank of Uganda and participating commercial banks, borrowers were required to provide collateral to access the loans from the banks.

However, the insistence on collateral locks out small borrowers who often times are not willing to put up their land as security as that is the only major asset. This tool then indirectly becomes a prohibitive measure for agricultural finance. Innovative methods like using cash flows to determine credit worthiness and allowing for flexible debt repayments such as weekly installments or post harvest season are more attractive to such borrowers. Institutions therefore need to develop such innovative risk management models for the agricultural sector.

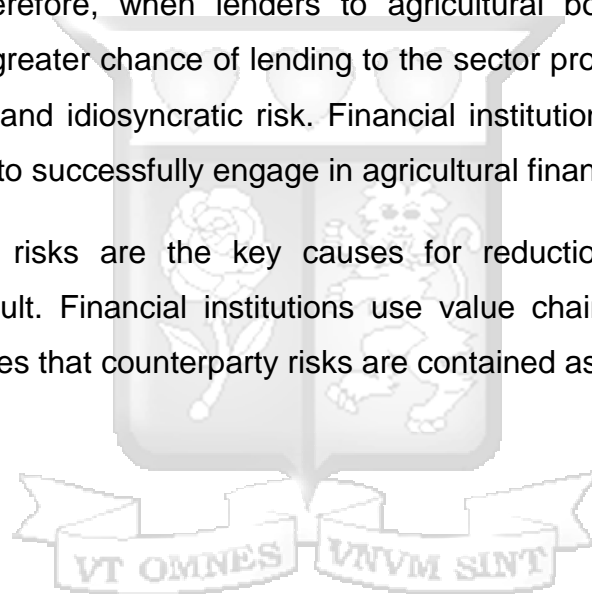
### **5.4 Measures to enhance credit risk management in agricultural finance**

The survey showed that agricultural credit risk can be significantly reduced and deployed to enable the sector become more profitable and attractive. Organizations should put in place robust structures, systems and procedures to quantify risk and reduce on the default risk. This is in agreement with Ejike, Ohajianya and Lemchi (2013) who found that with proper application of risk management techniques such as supervision, viability, collateral, sanctions, loan appraisal and insurance, risks and

defaults associated with agricultural lending can be reduced. This would increase the loans extended to the sector and profitability as well.

Financial institutions that have been successful in agricultural finance are those that have adopted semi-autonomous business models within their organizations to extend finance to the borrowers. For example, they employ agricultural officers in their departments to provide expertise and training to farmers, they are more actively involved in the production and marketing process and offer more flexibility to borrowers to cater for weather changes and seasonal market demand. Hence they go beyond simply extending credit to their borrowers as is done with other forms of loans such as unsecured loans. Therefore, when lenders to agricultural borrowers become their partners, they have a greater chance of lending to the sector profitably. This would help reduce both systemic and idiosyncratic risk. Financial institutions therefore require an entrepreneurial model to successfully engage in agricultural finance.

Price and production risks are the key causes for reduction in cashflows which increases risk of default. Financial institutions use value chain financing to mitigate these risks. This ensures that counterparty risks are contained as well.



## **CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS**

### **6.1 Introduction**

The first chapter of this study provides insight into the important role agriculture plays towards employment, economic growth and development. With 70% of people employed in the agriculture sector in sub-Saharan Africa, the sector plays a key role on the continent's economy. In Uganda, 71% are employed in agriculture and the sector contributes 22% to annual real output. Intervention in the sector to improve productivity through making credit accessible is important. However, a key hindrance to extending credit is the risk of default which is considered higher in this sector than in others because of the reliance on weather.

The second chapter reviewed relevant literature on credit risk measurement and management and how they are applied to the agricultural sector. Knowledge gaps were identified and conceptual framework was developed to study the relationships between the variables.

The third chapter presented the research design which showed how the data was collected and analyzed, including the data sources. Data findings were presented in the fourth chapter and discussed in the fifth chapter. Data analysis was aided by SPSS package and Excel. This chapter presents the conclusions drawn from the study and makes recommendations including areas for further research.

### **6.2 Conclusions**

The study was an investigation into credit risk measurement and agricultural finance. The objectives were (1) to analyze credit risk measurement in agricultural lending (2) to evaluate the effectiveness of risk management tools currently available to agricultural finance and (3) to identify measures to enhance credit risk management on agricultural finance.

The findings show that the organizations have put in place strong systems, structures and procedures to manage credit risk, from oversight from the Board of Directors to implementation from the line staff. However, these risk management measures are

generic and not specific to agricultural sector risks that are unique due to the nature of borrowers and the dependence on weather conditions.

Few organizations have devised innovative risk mitigation measures for the agricultural sector such as financing the entire value chain, training farmers or provision of extension services. This is to mitigate both product and market risks that may lead to loss of income and subsequent default. However such solutions require a review of both risk models and business models to ensure that such solutions are implemented.

### **6.3 Recommendations**

Expansion of agricultural finance is inhibited by few options for risk transfer such as agriculture insurance. Only 2.4% of respondents used weather-index based insurance, 4.8% used livestock insurance, 8.4% used crop insurance and only 1.2% used derivatives. Failure to transfer risk could be a key contributor to risk aversion in the agricultural sector. Innovative products and services in agricultural insurance should be developed and made available to lenders.

The findings showed that production risks in the agricultural sector were a significant cause of default. Pests, diseases or droughts that could fail production result in loss of income and default on loans. Addressing production problems would ensure stable cashflows and which would make agricultural borrowers attractive to lenders. The findings showed that inconsistent cashflows was the largest cause of rejection of loans to agricultural sector (34%). Interventions such as irrigation and other scientific methods of production would improve productivity in the sector.

### **6.4 Further research**

This study opens up further opportunities for research in both credit risk and agricultural finance given that both present recurring challenges to policy makers, business executives and the public at large. Further research may be done on determining loan defaults in the agricultural industry. This would help in credit profiling of the agricultural borrower. Additionally, research may be carried out on conventional risk management techniques and how they may be transferred to agricultural finance such as credit default swaps and other derivatives. This study also found that collateral, which was the

most popular form of security required by the institutions, was the least preferred by borrowers. This is because in most cases the land the farmers use is their only asset and hence they are reluctant to hand it over to the lenders as security for loans. Further research should be done on alternative loan guarantees beyond collateral.



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# APPENDIX

## Questionnaire

### STRATHMORE BUSINESS SCHOOL

#### INTRODUCTION

This study is being carried on *credit risk measurement and agricultural lending*. Please answer the questions freely. Your responses are important in enabling me understand one of the major challenges facing agricultural finance, which is the perceived high risk of default of agricultural loans. The questionnaire should take you about 10 minutes to complete. Please answer the questions in the space provided.

**ALL THE INFORMATION YOU PROVIDE WILL BE TREATED IN THE STRICTEST CONFIDENCE.**

I appreciate the time you have taken to complete this questionnaire and value your cooperation.

If you have any queries or would like further information on this project, please call me on 0710 847444 or send an email to blukwiya@gmail.com.

#### PERSONAL INFORMATION

Profession:.....

Name of Institution (optional):.....

Number of years of experience in Credit Analysis or Control, Risk Management, Audit or a related position or function

..... Years

Which title describes your role or position in this Institution

- |  |  |
|--|--|
| <input type="checkbox"/> Board Member        | <input type="checkbox"/> Senior Executive  |
| <input type="checkbox"/> Head of Department  | <input type="checkbox"/> Mid-level Manager |
| <input type="checkbox"/> Risk/Credit Officer | <input type="checkbox"/> Other             |
|  | (Specify).....                             |

**GENERAL INFORMATION**

(Please tick (√) where appropriate)

What type of loan products are provided by your institution?

- Personal or household loans
- SME loans
- Corporate loans
- Group or cooperative loans
- Other (please specify).....

Which are the major sectors your institution lends to?

- Building, construction and real estate
- Manufacturing
- Wholesale and retail trade
- Agriculture
- Transport and communication
- Tourism, education and other services
- Other (please specify).....

**RISK ASSESSMENT**

Would you agree or disagree with the following statements (Please tick (√) where appropriate)

1= Strongly agree; 2=Agree; 3=Agree; 4=Disagree; 5=Strongly disagree

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Loans to the agricultural sector are riskier than loans to other sectors					
Agricultural clients have higher default rates than non-agricultural clients					
Loans maturing over one year have higher default than short term loans maturing in less than a year					
Agricultural loans on average attract higher interest rates than non-agricultural loans because they are riskier					

Which of the following are the major causes of defaults in agricultural loans in your institution?

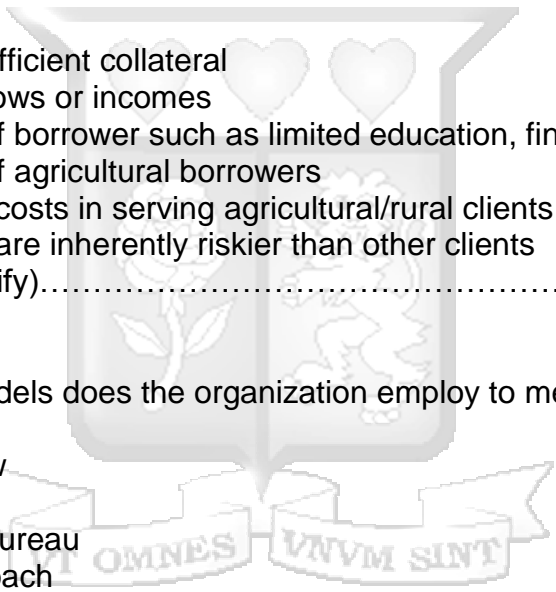
- Price fluctuation
- Weather changes and natural hazard such as drought
- Production problems such as pests and diseases
- Fraud
- Poor profiling of clients
- Information asymmetry
- Inadequate monitoring of clients
- Other (please specify).....

What are the major reasons for rejection of applications for agricultural loans in your institution?

- Unavailable or insufficient collateral
- Inconsistent cashflows or incomes
- Poor background of borrower such as limited education, financial illiteracy, etc
- Poor credit rating of agricultural borrowers
- Higher transaction costs in serving agricultural/rural clients
- Agricultural clients are inherently riskier than other clients
- Other (please specify).....

Which of the following models does the organization employ to measure credit risk?

- Credit portfolio view
- The Five Cs
- Credit Reference Bureau
- Equity based approach
- Stress testing
- Scenario analysis
- Ratings based approach
- Sensitivity analysis
- Financial statement analysis
- Value at Risk
- Other (Please specify).....



**RISK MONITORING AND CONTROL**

Would you agree or disagree with the following statements (Please tick (√) where appropriate)

1= Strongly agree; 2=Agree; 3=Disagree; 4=Disagree; 5=Strongly disagree

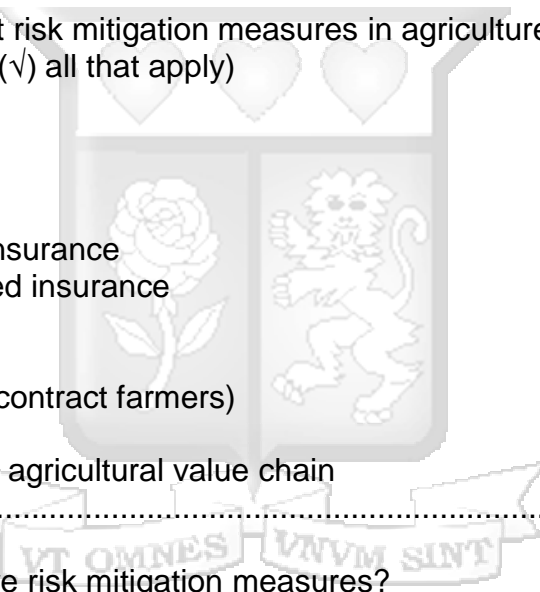
	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
The Board of Directors has effective oversight of the credit risk management strategy					
The Board of Directors regularly review policies and procedures to ensure that proper credit controls and risk management processes have been put in place					
The organization has comprehensive documented policies and procedures in place to manage the credit risk arising from the lending activities					
The organization is fully compliant with the Central Bank's Risk Management Guidelines					
The organizational processes ensure enhanced due diligence for customers and transactions identified as presenting a heightened risk of default					
The organization has sufficient employees in the risk and/or credit department to perform their assignments effectively					
The organization has in place robust and comprehensive training policies and procedures to equip risk/credit department staff with appropriate skills to perform their assignments					
The nature, frequency and effectiveness of independent reviews and audits of the credit portfolio and the credit process are adequate					

The organisation has a robust and effective enterprise risk data infrastructure in place					
The Organization has put in place a real time information system to keep track of the risk environment and respond adequately					
Consistent and diligent monitoring of agricultural loans can lower loan default of agricultural clients					

**RISK MITIGATION**

What is the nature of credit risk mitigation measures in agriculture taken by your organization? (Please tick (√) all that apply)

- Collateral
- Guarantees
- Group lending
- Crop or multi-peril insurance
- Weather-index based insurance
- Livestock insurance
- Derivatives
- Forward contracts (contract farmers)
- Training farmers
- Financing the entire agricultural value chain
- Other (Specify).....



How effective are the above risk mitigation measures?

5 – Excellent      4 – Very good      3 – Good      2 – Fair      1 - Poor

	Score
Collateral	<input type="text"/>
Guarantees	<input type="text"/>
Group lending	<input type="text"/>
Crop or multi-peril insurance	<input type="text"/>
Weather index based Insurance	<input type="text"/>
Livestock insurance	<input type="text"/>
Derivatives	<input type="text"/>
Forward contracts	<input type="text"/>
Training farmers	<input type="text"/>
Value chain financing	<input type="text"/>
Other	<input type="text"/>

What are the major challenges faced in the implementation of Credit Risk Management policies for agricultural loans at your institution? (Please tick (√) all that apply)

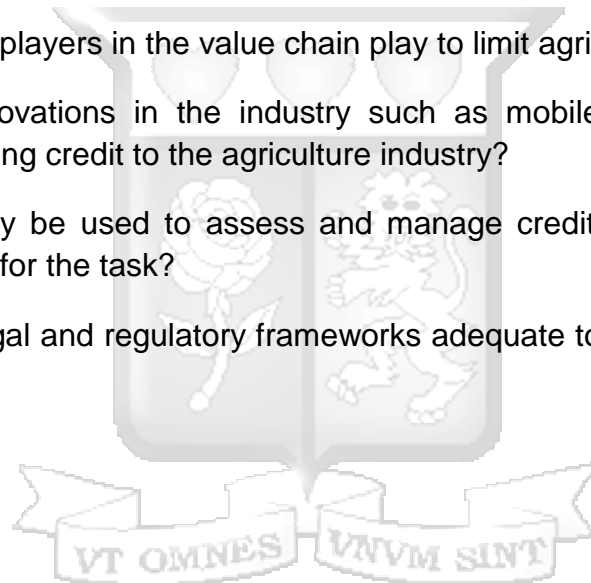
- Difficulty in quantifying risk
- Timeliness and quality of information
- Limited knowledge and skills within the organization
- Calculation of parameters
- High cost of implementing the policies
- Constraints due to Information Technology
- Difficulty integrating risk management with other business processes
- Information asymmetry
- Other (Please specify).....

**THANK YOU FOR YOUR TIME AND COOPERATION**



## Interview Guide

1. What is the demand for agricultural credit from your organization?
2. Does the existing financial and/or business model support efforts to finance the agricultural sector? What can be done differently?
3. Are lending institutions willing to lend to the agricultural sector?
4. What, in your approximation, is the size of the agricultural sector market?
5. What are the demand side issues inhibiting agricultural credit?
6. What are the supply side issues inhibiting agricultural credit?
7. What role can other players in the value chain play to limit agricultural credit risks?
8. What role can innovations in the industry such as mobile banking and agency banking play in extending credit to the agriculture industry?
9. How can technology be used to assess and manage credit risk? Are the existing technologies sufficient for the task?
10. Are the existing legal and regulatory frameworks adequate to support lending to the agricultural sector?



## Financial institutions in Uganda

List of licensed commercial banks as at 30<sup>th</sup> June 2015

1. ABC Capital Bank Limited Colline House Plot 4 Pilkington Road P.O. Box 21091 Kampala 256-414 345 200 256-414 258 310 SWIFT: ABCFUGKA E-mail: abc@abccapitalbank.co.ug Website: [www.abccapitalbank.co.ug](http://www.abccapitalbank.co.ug)
2. Bank of Africa Uganda Limited Plot 45 Jinja Road P.O. Box 2750 Kampala 256-414 302 001 256-312 254 100 256-414 230 902 SWIFT: AFRIUGKA E-mail: boa@boa-uganda.com Website: [www.boa-uganda.com](http://www.boa-uganda.com) [www.bank-of-africa.net](http://www.bank-of-africa.net)
3. Barclays Bank of Uganda Limited Barclays House Plot 2 Hannington Road P.O. Box 2971 Kampala 256-312 218 300/317 256-312 218393 SWIFT: BARCUGKX E-mail: Barclays.Uganda@barclays.com Website: [www.barclays.com](http://www.barclays.com)
4. Bank of Baroda (Uganda) Limited Plot 18 Kampala Road P.O. Box 7197 Kampala 256-414 237 898 256-414 233 680/1 256-414 230 781 SWIFT: BARBUGKA E-mail: bobho@dmail.ug Website: [www.bankofbaroda.ug](http://www.bankofbaroda.ug)
5. Bank of India (Uganda) Limited Plot 37 Jinja Road P.O. Box 7332 Kampala 256-313 400 400 256-414 341 880 E-mail: [BOI.Uganda@bankofindia.co.in](mailto:BOI.Uganda@bankofindia.co.in)
6. Cairo International Bank Limited Plot 30 Kampala Road P.O. Box 7052 Kampala 256-414 230 141 256-414 230 136/7 256-414 230 130 SWIFT: CAIEUGKA E-mail: cibug@infocom.co.ug Website: [www.cairointernationalbank.co.ug](http://www.cairointernationalbank.co.ug)
7. Centenary Rural Development Bank Limited Mapeera House Plot 44/46 Kampala Road & Plot 2 Burton Street P.O. Box 1892 Kampala 256-414 232 393 256-414 346 856 256-414 251 276/7 256-414 251 273/4 SWIFT: CERBUGKA E-mail: info@centenarybank.co.ug Website: [www.centenarybank.co.ug](http://www.centenarybank.co.ug)
8. Citibank Uganda Limited Centre Court Plot 4 Ternan Avenue P.O. Box 7505 Kampala 256-414 305 500 256-312 305 500 256-414 340 624 SWIFT: CITIUGKA Website: [www.citigroup.com](http://www.citigroup.com)
9. Commercial Bank of Africa (U) limited Twed Tower Plot 6 Kafu Road, Nakasero Kampala P.O. Box 74827, Kampala 256-414 232733 256-414 344172 256-414 340624 SWIFT: CBAFUGKA Website: [www.cbagroup.com](http://www.cbagroup.com)
10. Crane Bank Limited Crane Chambers Plot 38 Kampala Road P.O. Box 22572 Kampala 256-414 341 403/5 256-414 345 345 256-414 341 414 256-414 231 578 SWIFT: CRANUGKAXX E-mail: cranebank@cranebanklimited.com Website: [www.cranebanklimited.com](http://www.cranebanklimited.com)

11. DFCU Bank Limited Plot 2 Jinja Road P.O. Box 70 Kampala 256-414 346 497 256-414 351 000 256-312 300 229/374 256-414 231 687 SWIFT: DFCUUGKA E-mail: customerservice@dfcugroup.com Website: [www.dfcugroup.com](http://www.dfcugroup.com)
12. Diamond Trust Bank Uganda Limited Diamond Trust Building 256-414 387 000 256-312 261 167 256-414 342 286 SWIFT: DTKEUGKA E-mail: dtbu@spacenetuganda.com Plot 17/19 Kampala Road P.O. Box 7155 Kampala Website: [www.diamondtrust-bank.com](http://www.diamondtrust-bank.com)
13. Ecobank Uganda Limited Plot 4 Parliament Avenue P.O. Box 7368 Kampala 256-417 700 100 256-312 266 078 256-312 266 079 SWIFT: ECOCUGKA E-mail: ecobankug@ecobank.com Website: [www.ecobank.com](http://www.ecobank.com)
14. Equity Bank Uganda Limited Plot 390 Muteesa 1 Road Katwe P.O. Box 10184 Kampala 256-312 262 437 256-414 531 377 256-312 262 436 SWIFT: EQBLUGKA E-mail: info@equitybank.co.ug Website: [www.equitybank.co.ug](http://www.equitybank.co.ug)
15. Guaranty Trust Bank (U) Limited Plot 56 Kira Road P.O. Box 7323 Kampala 256-414 233 833 256-414 237 305 SWIFT: FBAKUGKA E-mail: bankingug@gtbank.com Website: [www.gtbank.com](http://www.gtbank.com)
16. Finance Trust Bank Limited Plot 121&115, Katwe P.O. Box 7323 Kampala 256-414 341 275 256-414 255 146 256-414 237 046 256-414 255 144 SWIFT: FTBLUGKA E-mail: [contact@financetrust.co.ug](mailto:contact@financetrust.co.ug)
17. Housing Finance Bank Limited Investment House Plot 4 Wampewo Avenue Kololo P.O. Box 1539 Kampala 256-414 259 651/2 256-312 262 614 256-414 341 429 SWIFT: HFINUGKA E-mail: info@housingfinance.co.ug Website: [www.housingfinance.co.ug](http://www.housingfinance.co.ug)
18. Imperial Bank (Uganda) Limited Plot 6 Hannington Road P.O. Box 36206 Kampala 256-312 320 400/9 256-312-202 162 SWIFT: IMPLUGKA E-mail: [info@imperialbank.co.ug](mailto:info@imperialbank.co.ug)
19. KCB Bank Uganda Limited Commercial Plaza, Plot 7 Kampala Road P.O. Box 7399 Kampala 256-417 118 200 256-414 345 751 SWIFT: KCBLUGKA E-mail: kcbugandaho@kcb.co.ug Website: [www.kcbbankgroup.com](http://www.kcbbankgroup.com)
20. NC Bank Uganda Limited Rwenzori Towers Plot 4/6, Nakasero Road P.O. Box 28707 Kampala 256-772 223 300 256-417 337000 256-312 388000 Website: [www.nic-bank.com](http://www.nic-bank.com) E-mail: [info@nc-bank.com](mailto:info@nc-bank.com)
21. Orient Bank Limited Orient Plaza Plot 6/6A Kampala Road P.O. Box 3072 Kampala 256-417 719 100/228 256-414 348 039 SWIFT: ORINUGK E-mail: mail@orient-bank.com Website: [www.orient-bank.com](http://www.orient-bank.com)

22. Stanbic Bank Uganda Limited Crested Towers Short Tower Plot 17 Hannington Road P.O. Box 7131 Kampala 256-312 224 111/ 600 256-417 154 600 256-414 231 116 256-414 230 068 SWIFT: SBICUGKX Website: [www.stanbic.com](http://www.stanbic.com)

23. Standard Chartered Bank Uganda Plot 5 Speke Road P.O. Box 7111 256-414 258 211/7 256-414 349 505 256-414 342 875 SWIFT: SCBLUGKA E-mail: scb\_uganda@ug.standardchartered.co m Website: [www.standardchartered.com](http://www.standardchartered.com)

24. Tropical Bank Limited Plot 54, Uvan House Lugogo Bypass P.O. Box 9485 Kampala 256-417 117220 256-312 264 494 SWIFT: TROAUGKA Email: admin@trobank.com Website: [www.trobank.com](http://www.trobank.com)

25. United Bank for Africa (Uganda) Limited Spear House Plot 22 Jinja Road P.O. Box 7396 Kampala 256-417 715 122 256-417 715 100 256-417 715 117/1 SWIFT: UNAFUGKA E-mail: [ubauganda@ubagroup.com](mailto:ubauganda@ubagroup.com)

#### Updated list of licensed credit institutions as at 30<sup>th</sup> June 2015

1. Mercantile Credit Bank Ltd Plot 8 Old Portbell Road P.O Box 620 Kampala +256 - 414235967 +256 414- 251241 info@mcb.co.ug [www.mcb.co.ug](http://www.mcb.co.ug)

2. PostBank Uganda Ltd Plot 4/6 Nkrumah Rd P.O Box 7189 Kampala. +256-417-157200/705/706 +256 414- 347107 info@postbank.co.ug [www.postbank.co.ug](http://www.postbank.co.ug)

3. Opportunity Bank Uganda Ltd 7A John Babiiha Avenue (Acacia Avenue), Kololo P.O Box 33513 Kampala +256-414- 236724/342726 +256 414- 348724 info@opportunitybank.c o.ug. [www.opportunitybank.co.ug](http://www.opportunitybank.co.ug)

4. Top Finance Bank Uganda Ltd. Plot 3,Dundas Road Kololo Courts P.o Box 33913,Kampala +256- 312300699/+256 -414560600 None. info@topfinancebank.co. ug [www.topfinancebank.co.ug](http://www.topfinancebank.co.ug)

#### Microfinance Deposit-Taking Institutions (MDIs)

1. FINCA Uganda Ltd (MDI) Head Office: Plot 11, Acacia Avenue, Kampala P. O. Box. 24450, Kampala Tel: +256 414 231134/+256 312 262372 Fax: +256 414 340078 Email: [finca@finca.or.ug](mailto:finca@finca.or.ug)

2. Pride Microfinance Ltd (MDI) Head Office: Victoria Park, Block B, Bukoto, Plot 6-9, Ben Kiwanuka Okot Close, P. O. B ox 7566, Kampala Tel: +256 414 346297/346930/258150, +256 312 262365/6 Fax: +256 414 346147 Email: [pml@pridemicrofinance.co.ug](mailto:pml@pridemicrofinance.co.ug)

3. UGAFODE Microfinance Ltd (MDI) Head office: Silva Arcade, Plot 62 Bombo Road  
P.O. Box 30815, Kampala Tel: +256 414 257181, +256 414 235771/8 Fax: +256 414  
257182 E-mail: [admin@ugafode.co.ug](mailto:admin@ugafode.co.ug)

4. EFC Uganda Ltd (MDI) Head office: P.O. Box 33667, Master Wood Plaza, 1156  
Masaka Road

