FORMAL AND INFORMAL CREDIT DEMAND BY RICE FARMERS IN THE NORTHERN REGION OF GHANA

BY

MUNIRA ALHASSAN MUHAMMED

(10362172)

THIS THESIS IS SUMMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MPHIL ECONOMICS DEGREE.

JULY, 2013

DECLARATION

This is to certify that this thesis is the result of research undertaken by Muhammed Munira Alhassan, towards the award of Master of Philosophy Degree in Economics at the Department of Economics, University of Ghana, Legon.

Signature…..……. Date: ……

MUNIRA ALHASSAN MUHAMMED

(10362172)

Signature…..……. Date: ……

Ms. ABENA D. ODURO

(PRINCIPAL SUPERVISOR)

Signature…..……. Date: ……

DR. YAW ASANTE

(CO-SUPERVISOR)

ABSTRACT

Limited access to credit is one of the fundamental problems faced by rice farmers in the Northern Region of Ghana. As such, it is the aim of government and other organizations such as the Food Security and Rice Producer Organization (FSRPOP) to increase rice farmers' access to credit. However, studies on the demand side of the credit market of rice farmers that would help formulate appropriate policies essential for increasing rice farmers' demand for credit are missing. The study provides evidence on the demand side of credit market of rice farmers by identifying the sources of credit to rice farmers, estimating the demographic as well as socio-economic factors that affect rice farmers' demand for formal and informal credit, and ascertaining whether formal and informal credit are substitutes or complements using survey data of 200 rice farmers.

The study adopts the probit estimation method to estimate the overall determinants of credit demand and the bivariate probit estimation technique to jointly estimate the determinants of demand for formal and informal credit and to ascertain whether formal and informal credits are substitutes or complements. The results of the study revealed that formal sources of credit to rice farmers comprised of universal banks, rural banks, and other formal credit sources. Informal credit sources on the other hand comprised friends and relatives and money lenders. Specifically, formal credit demand is significantly influenced by the gender of the farmer, household size, education, agricultural commercialization and location. Informal credit demand on the other hand in addition to being negatively influenced by age and education, is positively influenced by household size, level of agricultural commercialization, engagement in other economic activities in addition to rice farming and value of assets. The result of the bivariate probit suggests that formal and informal credits are perfect substitutes to rice farmers.

The study recommends that formal banks should be motivated to grant credit to farmers, policies should be designed to encourage farmers become more commercially oriented, credit schemes provided by government should target those farmers with high level of agricultural commercialization since they are more likely to demand credit, the government and policy makers should initiate specific policies that will either mandate or motivate formal financial institutions to get representatives in rice producing villages educate farmers on their lending procedures, assist farmers fill loan application forms, thereby making the access and use of formal credit more convenient to farmers.

DEDICATION

This thesis is dedicated to the Almighty Allah, to my parents Muhammed Alhassan and Ali Mariama, my husband Abubakari Shani and my son Mohammed Ashiraf.

ACKNOWLEDGMENTS

I am very grateful to the almighty Allah for seeing me through the writing of this thesis. Also, my heartfelt thanks go to my parents, Muhammed Alhassan and Ali Mariama; and my husband, Abubakari Shani for their prayers, support and encouragement.

Special thanks go to my supervisors Mis Abena D. Oduro and Dr. Yaw Asante for the assistance rendered to me in all possible ways. Their guidance throughout the process of executing the study helped me come out with this thesis.

I further express my appreciation to the International Food Policy Programme (IFPRI) and the African Economic Research Consortium (AERC) for the financial support they extended to me in the process of writing my thesis.

To sum up, I accord whoever assisted me in any way in the writing of my thesis with sincere gratitude.

Nevertheless, I am fully answerable and bear total responsibility for any mistake, inaccuracy or inadequacy that may be found in this work.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS/ABBREVIATIONS

ADB	Agricultural Development Bank
ARB	Association of Rural Banks
BOG	Bank of Ghana
CUAs	Credit Union Association
CUs	Credit Unions
FBO	Farmer Based Organizations
FINSAP	Financial Sector Adjustment Programme
FSRPOP	Food Security and Rice Producer Organization Project
GLSS5	Ghana Living Standard Survey Five
ISSER	Institute of Statistical Social and Economic Research
LRDP	Lowland Rice Development Project
MOFA	Ministry of Food and Agriculture
NBFI	Non-Bank Financial Institutions
NDPC	National Development Planning Commission
NGO	Non-Governmental Organization
PNDC	Provisional National Defence Council Law
RCB	Rural and Community Bank
ROSCA	Rotating Savings and Credit Association
SLCs	Savings and Loans Companies
SPSS	Statistical Package for Social Scientist

CHAPTER ONE

INTRODUCTION

1.1 Background to Study

The agricultural sector in Ghana plays a very important role in employing majority of the active labour force. Currently, it employs 50.6% of the economically active population in the country (MOFA, 2011). However, poverty rates among farmers especially food crop farmers who are mostly smallholders remain high as compared to the national average (GSS, 2007). Increasing agricultural productivity has however been mentioned as one of the means of eradicating poverty among famers (ISSER, 2011).

For increased agricultural productivity however, there is the need to solve problems such as low level of technology (especially mechanization), inadequate post-production infrastructure, low uptake of research findings by stakeholders, limited availability of improved technological packages and inadequate flow of financial facility for agriculture that cause low productivity in the sector (NDPC, 2010; Quartey, Udry, Seidu, and Seshie, 2012). However, paramount amongst these constraints is inadequate flow of financial facilities. This is because with financial facility such as credit, farmers can overcome constraints such as purchasing modern farm equipments and also expand their farm lands. Consistent with this, Hosseini, Khaledi, Gborbani and Brewin (2012) in a study of analysis of transaction cost of obtaining credit in Iran pointed out that credit is important for modernization of small-scale agriculture as well as the introduction of commercialization into the rural economy.

As a result of the importance of credit to agricultural production, the Ghana Shared Growth and Development Agenda has emphasized the expansion in agricultural financing. This is to be done through the Central Bank promotion of the building up of capacities of various

financial institutions as well as provision of incentives to financial institutions to ensure adequate flow of finance to the agricultural sector (NDPC, 2010).

There are two major sources of credit in Ghana. This is basically made up of the formal and informal sources from which farmers can borrow. Formal credit providers comprise banks while informal credit providers include relatives and friends, private money lenders, susu collectors, trade creditors, landlords and opinion leaders (Aryeetey, 1994; Aryeetey and Udry, 1997, Ekumah and Essel, 2000). Among informal lenders however, money lenders are noted to be performing major role in agricultural financing (Quartey*et al.,* 2012). The view by analysts that financial sector reforms will lead to a decline of informal finance (Aryeetey, 2008) seems not to work in the case of Ghana. This is because both formal and informal financial markets co-exist and provide complementary and supplementary services to each other (Aryeetey, 1992).

Despite the existence of both formal and informal credit sources and evidence of increase in their number, farmers in Ghana still have limited access to credit (Owusu-Antwi and Antwi, 2010). Reasons for their limited access to credit from these sources are that, each credit source has its own constraints that limit either the ability of a farmer to obtain credit from the source or the amount of credit the farmer wishes to borrow. For instance, formal financial markets often require collateral in the form of land and houses (Owusu-Antwi and Antwi, 2010) as a pre-requisite for granting of loans to borrowers which are often out of reach of majority of the farming population. In addition, the low rate of interest on agricultural loans and the long-term nature of agricultural loans particularly in situations of high risk are also some of the reasons that prevent banks from lending to farmers (Owusu-Antwi and Antwi, 2010).

On the other hand, though informal credit plays an important role in agriculture, credit obtained from informal financial markets is often too little, has higher interest rates and too short a maturity period (Aryeetey, 2008). In spite of these problems, credit from informal sources to a varying degree is characterized by easy access, flexibility in loan use, rapid processing and flexibility in interest and collateral requirements (Aryeetey, 2008). All these constraints associated with borrowing from formal and informal sources according to Bendig, *et al.* (2009), limit farmers' ability to obtain adequate credit necessary for purchasing modern agricultural equipment and improved seed varieties needed for increasing yield of output and expansion of farm lands.

Rice has become the second most important cereal in terms of consumption after maize in Ghana (Osei-Asare, 2010) and local consumption is on the rise (USAID, 2012). Domestic consumption however far out-weighs production (Ofori *et al.*, 2010), despite the fact that large fertile land that can be converted into rice production still exists. However, rice farmers still have limited access to credit which is crucial for increased agricultural production and improvement in livelihoods of these farmers (Akudugu, 2012).

The implication is that if rice farmers' access to credit is improved they will be able to purchase modern farm equipment, adopt new technologies and expand their farm lands which will increase their yield and subsequently increase their contribution to achieving self-sufficiency in rice production. It is however argued elsewhere that in an attempt to increase farmers' access to credit, the demand side of the credit market should be taken into consideration as access to credit does not mean farmers will demand credit. For instance, Mpuga (2008) pointed out that the availability of credit has limited impact on the demand

for credit by rural population in Uganda because previous governments have focused on supply side factors in providing credit without regard to demand side factors.

1.2 Problem Statement

The Northern Region is the highest contributor to domestic rice production in Ghana (Osei-Asare, 2010). Limited access to credit, however, has been cited as one of the major constraints faced by rice farmers in this region. Studies such as Seidu (2008) and Quaye *et al.*, (2010) confirm this assertion. The limited access to credit constrains farmers' ability to adopt recommended technologies that are productivity–enhancing (Mohamed and Temu, 2008).

The issue of credit availability and accessibility by farmers has been widely discussed over the years. In fact, the role of credit in farm activities cannot be overemphasized. Due to the indispensable role of credit in farm activities, one of the objectives of the Food Security and Rice Producer Organization Project (FSRPOP) which was an extension of the Lowland Rice Development Project (LRDP) established in the Northern Region, was to assist rice farmers form Farmer Based Organizations (FBO) that will enable them access and manage credit (Quaye *et al.*, 2010).

It is however argued elsewhere that access to credit does not necessarily imply that farmers will demand it. Farmers can have access to credit but choose not to borrow due to their demographic and socio-economic characteristics (Togba, 2009). Also, recent empirical studies (e.g. Akudugu, 2012, Awunyo- Vitor and Abankwah, 2012) in Ghana have revealed that farmers' demand for credit is influenced by their individual demographic characteristics as well as socio-economic characteristics which may however vary depending on the type

of credit market (demand). This therefore calls for further empirical work on the determinants of rice farmer's demand for credit in the Northern Region of Ghana which would help determine appropriate policy prescriptions regarding the formation of credit facilities that will suit the credit needs of these famers.

Also, studies undertaken by (Aryeetey and Gockel, 1991; Awunyo-Vitor and Abankwah, 2010 and Ekumah and Essel, 2001) pointed out that there exist a large variety of credit providers within the formal and informal financial markets in Ghana. This, according to Aryeetey and Gockel (1991) makes it difficult to characterize the nature and structure of demand for financial services especially in the informal sector.

In a related study, Aryeetey (1992) finds that despite the fact that financial market in Ghana is widely segmented, demand for credit facilities in one sector cannot always be said to be exclusive to that sector. In line with this, the question that arises is whether the demand for credit by rice farmers from the formal credit sector competes or complements demand for credit from the informal credit sector.

Although studies (for instance Seidu, 2008 and Quaye *et al*., 2010) have pointed out that rice farmers in the Northern Region lack access to credit and financial capital and recommend that provision of credit to rice farmers will help boost their productivity, there has not been any study to the best of the researcher's knowledge to identify the sources of formal and informal credit to rice farmers; to assess the determinants of rice farmers' demand for formal and informal credit; and to ascertain whether the demand for credit by rice farmers in the formal sector competes or complements demand for credit in the

informal sector in the Region. The study therefore seeks to find empirical responses to the following research questions.

1. What are the sources of formal and informal credit to rice farmers?
2. What are the determinants of rice farmers' overall demand for credit?
3. What are the determinants of rice farmers' demand for formal and informal credit?
4. Are formal and informal credit demand substitutes or complements?

1.3 Objectives of the Study

The overall objective of the study is to investigate the determinants of rice farmers' demand for formal and informal credit.

Specifically, the study aims at achieving the following objectives;

1. Identify the various sources of formal and informal credit to rice farmers.
2. Identify and estimate the determinants of rice farmers' demand for credit.
3. Estimate and compare the determinants of rice farmers' demand for formal and informal credit.
4. Ascertain whether the formal and informal credits are substitutes or complements.

1.4 Research Hypotheses

The study seeks to test the following hypotheses.

1. $H_{0:}$ There is a significant relationship between demographic and socio-economic characteristics of rice farmers and their overall demand for credit.

   $H_{1:}$ There is no significant relationship between demographic and socio-economic characteristics of rice farmers and their overall demand for credit.

2. $H_{0:}$ There is a significant relationship between demographic and socio-economic characteristics of rice farmers and their demand for formal and informal credit.

   $H_{1:}$ There is no significant relationship between demographic and socio-economic characteristics of rice farmers and their demand for formal and informal credit.

3. $H_{0:}$ There is a significant relationship between the demand for formal and informal credits.

   H_1: There is no significant relationship between the demand for formal and informal credits.

1.5 Justification of the Study

Empirical studies (e.g. Seidu, 2008 and Quaye *et al*., 2010) have pointed out that rice farmers in the Northern Region have limited access to credit and recommend that the provision of credit to these rice farmers will help boost their productivity. As such, one of the objectives of the Food Security and Rice Producer Organization Project (FSRPOP) (Quaye, 2012) is to assist rice farmers in the Northern Region access and manage credit.

Mpuga (2008) has however, pointed out that in the context of Uganda, government provided credit has not been successful because previous government have focused on supply side factors without regard to the demand side factors. He added that the availability of credit has limited impact on the demand for credit by the rural population in Uganda. This implies that for successful implementation of credit programmes that will help increase farmers access to credit, it is necessary to study the demand side of credit market of these farmers.

The study will therefore provide empirical evidence on the sources of credit from which rice farmers demand credit, the factors that influence individual rice farmers' demand for credit which is vital in informing policy makers to designing strategic and specific credit facilities that will suit the needs of rice farmers. In addition, the study will also find out whether formal and informal credit substitute or complement each other in terms of credit provision to rice farmers. This will inform policy makers as to whether to design policies that will enhance the existence of the two credit sources if they are complements or strengthen the activities of one credit market if they are substitutes.

1.6 Scope of the Study

This study was carried out in the Northern Region of Ghana in the month of March 2013. The data used for the analysis was collected from rice farmers using simple random sampling with the help of the regional office of Ministry of Food and Agriculture (MOFA) in the Tamale Metropolis. A sample size of 200 rice farmers were chosen from two major rice producing districts; Tamale Metropolis and Tolon-Kumbungu District base on the 2011/2012 production year due to limited availability of resources and time to undertake the study. The study investigates the factors that influence rice farmers' demand for formal and informal credits. The study does not cover rice producers in the entire nation due to time and financial limitations, but pertains only to two districts of the Northern Region. Nevertheless, some lessons learnt may be applicable to rice farmers in other parts of the country.

1.7 Organization of the Study

The study consists of six main chapters. Chapter one covers the general background, the research problem, objectives of the study, justification of the study and organization of the study. Chapter two reviews relevant literature on the demand for credit, chapter three

presents the overview of the financial sector in Ghana, and chapter four present the methodology used in addressing the objectives. Empirical results are presented and discussed in chapter five. Chapter six presents the summary, conclusion, policy recommendations and areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the relevant literature on the demand for formal and informal credit. The review is to provide the basis for the design of methodology, analysis of data, presentation of results and findings. The chapter is divided into five main sections. Section 2.2 discusses the concept of demand for credit, section 2.3 covers the theoretical review, section 2.4 reviews empirical literature on the determinants of formal and informal credit demand and the relationship between formal and informal credit demand and section 2.5 concludes the chapter.

2.2 The Concept of Demand for Credit

Credit has been recognized to be of crucial importance from both consumption and investment perspectives (Okurut, *et al.*, 2004). Demand for credit is therefore seen as a household's desire to supplement consumption and/or investment through credit (Briggeman, *et al*, 2007). As a result of the importance of credit, empirical researchers have attempted to study the credit markets in both developing and developed countries. In particular, areas often considered include the types of credit markets available and the factors that influence individual's demand for credit from these sources as a way of recommending policies that will help enhance access to credit.

In the review of empirical literature concerning the demand for credit, different researchers have defined the demand for credit differently. For instance, Tang et al., (2010) and Awunyo-Vitor and Abankwah (2012) defined the demand for credit to mean participation in borrowing where an individual is said to demand credit if he/she borrows credit. On the

other hand they classify individual as not demanding credit if he/she does not participate in borrowing. Some researchers (see eg, Zeller, 1994 and Chen and Chivakul, 2008) however maintain that, participation in borrowing is a function of individual's demand for credit (demand factors) and his or her access to credit market (supply factors). Zeller (1994) particularly pointed out that, an individual who wants credit decides on the sum to apply for from a particular source. The lender undertakes the screening of the potential client based on observable characteristics in order to try and minimize default risk. After screening, the lender may decide to fully grant the loan amount demanded, grant part of the loan or refuse to give the client the loan amount demanded. The situation where the loan amount is partially granted or completely rejected represents credit constraint (Zeller, 1994). What the above implies is that defining the demand for credit to mean participation in credit market may result in the exclusion of some group of credit demanders since, it is possible for some individuals to have demand for credit by putting up an application for credit but prevented from participating (borrowing) in credit market by lenders (supply side factors).

To correct the above problem some researchers (Okurut et al, 2004; Mpuga, 2008; Balagon and Yusif, 2011) define the demand for credit to imply putting up an application for credit irrespective of whether or not credit is received. Accordingly, they classify an individual to be demanding credit if he/she puts up an application for credit and does not demand credit if he/she does not apply for credit. Here credit demanders will include individuals with granted loan applications (whether partially or fully) and those with rejected applications.

It has however been pointed out that there are situations where individuals may need credit, but voluntarily exclude themselves from applying because they are discouraged by reasons such as lack of collateral and fear that the application will be rejected. Following this line of

arguments, Crook and Hochguertel, (2006) and Malapit, (2012) conceptualized the demand for credit as a multi-stage decision process. If an individual has a positive demand for credit he/she may actually not apply for a loan because he/she is discouraged by the prospect of possible rejection. If an individual is not discouraged and have positive demand for credit, he/she would apply for a loan. The application may be entirely turned down, it may be partly rejected in the sense that only part of the loan amount applied for is granted or fully granted.

Consequently, they define an individual as demanding credit if he/she has loan application granted (whether partially or fully), completely rejected or did not apply (though he/she needs credit) because he/she was discouraged for reasons such as lack of collateral and fear of prospect of possible rejection of loan application. On the other hand they define an individual as not demanding credit if he/she did not apply for credit because he/she has no need for credit. From the foregoing review of the concept of demand for credit, it is clear that participation in borrowing and demand for credit which are often used interchangeably are different concepts which need to be taken note of in the study of the demand for credit.

2.3 Theoretical Review

This section is dedicated to the review of theoretical literature on the demand for credit and its' determinants and the relationship between the demand for formal credit and the demand for informal credit.

2.3.1 Theoretical Review on the demand for credit and its determinants

The theory of consumer behaviour on the demand for a commodity is often used as a basis for the analysis of the demand for overall credit as well as the demand for formal and informal credit. Accordingly, Mpuga (2008) and Balogun and Yusuf (2011) adopted the theory of consumer behaviour on the demand for a commodity as a starting point in their

studies of the demand for credit by individuals. The theory of consumer behaviour posits that every consumer aims at maximizing his or her satisfaction by choosing the optimum bundle of goods and services, constrained by his or her income. By optimizing the direct utility function subject to the budget line we derive the demand function which expresses quantity demanded as a function of prices and income (Gravelle and Rees, 2004).

The concept of individual demand for credit therefore refers to the variation in quantity of credit that an individual is expected to demand at the specified interest rate and time period assuming all other pertinent factors remain constant (Balogun and Yusuf, 2011). However, according to Osei-Assibey (2009), the demand for financial services goes beyond such economic factors to include non-economic factors. These non-economic factors include individual demographic and socio-economic characteristics. Though individual demographic characteristics remain the same across studies on demand for credit, socio-economic characteristics differ across studies depending on the focus and area of the study.

Demographic factors identified by studies such as Heffernan and Pollard (1983), Mohamed (2003) and Mpuga (2008) to have likely influence on the demand for credit include age, sex, education, household size and marital status. For instance, in the case of age Mpuga (2008) points out that following the life-cycle hypothesis, the young and energetic individuals with an ambition to earn higher incomes, are expected to be more active in terms of saving/dis-saving in order to accumulate wealth. Consequently, the young may tend to save and/or borrow more for investment while the old may be less inclined to save/borrow. Therefore younger farmers are more likely to borrow than older farmers. Chen and Chivakul (2008) explain that individuals with larger household size are more likely to have a higher dependency ratio which will increase their credit needs making them more likely to demand credit than individuals with smaller household size. Heffernan and Pollard

(1983), highlight the relationship between education and demand for credit. According to them, the more educated farmers are the more their ability to understand the importance of modern technologies and improved seed varieties. This will result in more educated farmers demanding more credit to enable them purchase modern farm equipment and improve seed varieties.

Researchers such as Heffernan and Pollard (1983), Akudugu, (2012), Awunyo-Victor and Abankwah (2012) in their studies on farmers demand for credit have also emphasized the importance of farm level characteristics such as level of agricultural commercialization, farm size and hired labour employed in farmers decision to demand credit. For instance, Heffernan and Pollard (1983) indicate that more commercial farmers will like to maintain production at high level in order to increase marketable surplus by continuously upgrading their farm operations. This frequently requires credit for working capital hence making more commercialized farmers more likely to demand credit. Also, according to Miracle cited in Heffernan and Pollard (1983) considering the costs and returns to hired labour in choosing among alternative production strategies, farmers who hire labour may exhibit a higher degree of managerial ability and hence the willingness and ability to adopt new technology making them more likely to demand credit.

Other variables identified to have likely influence on the demand for credit which need to be considered include farmers' engagement in other economic activities in addition to farming and total value of assets. For instance, Heffernan and Pollard (1983) argue that farmers who have a reliable stream of income from off farm employment may be under less pressure to increase farm production hence are less likely to demand credit for farming. Furthermore, he added that income from off-farm employment increases the farm

household's internal liquidity providing more capital with which to undertake farm level activities or innovations which will negatively influence the probability of demanding credit by farmers. Tarp and Burslund (2008) argue that the total asset base could theoretically affect the probability of demanding credit both negatively and positively. For instance, a larger asset base would tend to make self-financing of loans more viable and hence less demand for credit. On the other hand, it may also improve the loan terms an individual is offered by serving as collateral which enables an individual to demand credit.

Therefore by building on the basic theory of demand with the arguments advanced above, the demand for credit function can be specified as

$fDi = fi\ (Hi, Qi,)$ … ……………………………………………………………………(2.1)

Where:

fD_i is the demand for credit by individual i.

Hi is a vector representing individual demographic characteristics including sex, age, level of education, marital status and household size and Qi represents socio-economic variables such engagement in other economic activities, total value of assets, level of agricultural commercialization, farm size and hired labour.

2.3.2 Theoretical review on the relationship between Formal and Informal Credit Demand

Salvatore and Diulo (2003) maintain that changes in the price of a related commodity either increase or decrease the demand for a commodity depending on whether the related commodity is a substitute or complement. For substitutes, it is expected that an increase in the price of a commodity will lead to an increase in the demand for the other and for complement the reverse is true.

Consistent with this, Aryeetey (1992), pointed out that a general discussion of the substitution and complementary relationship between two goods emphasizes the responsiveness of demand for one good to price changes in the other such that if:

$\delta d_I / \delta p_I [P_I, Y] > 0$, then the two goods are competitive/Substitute; and if

$\delta d_I / \delta p_I [P_I, Y] < 0$, then the two goods are complements

Aryeetey (1992) however pointed out that in the discussion of formal and informal finance the application of price in such a deterministic manner loses relevance in view of the highly indeterminate relationship between price and demand in less sophisticated financial markets. As a result, the discussion of substitution and complementarity will need partially to ignore the issue of price and operate more with quantities and responses to other factors such as availability of credit. He also added that further analysis to study complementarity and substitution between formal and informal credit became impossible using the above if the demand for formal or informal credit turn out to be zero for an individual.

Few empirical studies such as Mohieldin and Wright (2000) and Awunyo-Vitor and Abankwah (2012) have however attempted to find the interaction between demand for formal and informal credit by jointly modelling the demand for formal and informal credit in a bivariate probit framework. This bivariate probit framework allows for the correlation of error term (Bawm, 2006) such that if the rho (p-value), which is a statistical indicator of the relationship between the two decision processes (the decision to demand credit from the formal and informal credit source) is statistically significant from the bivariate probit estimation result it is concluded that there is indeed a relationship between the demand for

formal and informal credit. The type of relationship is however determined by the sign of the coefficient of rho (p-value). If it is positive it is concluded that they are substitutes and if it is negative then they are complements.

2.4 Empirical Literature Review

This section reviews the empirical studies on the demand for credit. Literature will be reviewed on the determinants of formal credit demand followed by a review of literature on informal credit demand and the relationship between formal and informal credit demand.

2.4.1 Empirical Literature on the Demand and Determinants of Formal Credit.

The role of formal credit in individual production and consumption activities has been widely documented by empirical studies. It has however been observed that though demand for credit from the formal source may sometimes be for consumption purposes, for the most times they are demanded for production purposes. For instance Mohieldin and Wright (2000) pointed out that in Egypt, borrowing from the formal sector generally tend to be for production purposes such as investment in agriculture, trade and industry. This was supported by Ateino (2001) who observe that the application of credit from formal sources in Kenya tend to be for starting and expanding of business. Barslund and Tarp (2008) also added their voices when they found from their study that 81% of loan demand from the formal credit sources was used for production purposes while only 3% was used for consumption purposes.

Several empirical studies have established that the demand for formal credit is influenced by individual demographic as well as socio-economic characteristics. For instance, age has been identified to be a significant determinant of demand for formal credit (Heffernan and Pollard, 1983; Mohamed 2003; Chen and Chivakul, 2008; Bendig et al 2009; Magri, 2002).

Mohamed (2003) particularly found age to have a negative and significant influence on the demand for formal credit, implying that older farmers are less likely to demand credit than younger farmers. He explains this finding to mean that older people are always risk averse, find it difficult to understand loan operations and conditions and fear loan condition of formal financial institutions which makes them less likely to demand formal credit. Chen and Chivakul, (2008) and Magri (2002) also found that age has a positive and quadratic relationship (captured by age square) with the probability of demanding formal credit. Chen and Chivakul (2008) explain this quadratic relationship to imply that young individuals prefer to borrow as their age increases but after hitting a certain age threshold, this probability declines. They defended their finding by arguing that young individuals have high marginal utility of consumption and expectation for income which makes them more likely to demand credit but after passing their economically active age group, the probability of demanding credit decreases as they engage in less economic activities.

Sex of the farmer has also been found by researchers to be a significant determinant of the demand for formal credit. The effect of gender on demand for formal credit has however been found to be mixed by empirical studies. While some researchers have found that men are more likely to demand formal credit, others have found that women are more likely to demand formal credit than men. For instance, Awunyo-Vitor and Abankwah (2012) established from their study that men are more likely to demand formal credit as compared to their female counterparts. This is because women control few assets, cultivate smaller acreages with low productivity which does not give them collateral security to demand formal credit which is one of the major requirements for obtaining formal credit. On the contrary, Akudugu's 2012 study of the determinants of credit demand by farmers and supply by rural banks in Ghana's Upper West Region, established that female farmers are

more likely to demand credit from the rural banks than their male counterparts. He defended this position by explaining that most credit schemes designed by banks and other development institutions such as NGOs focus more on women. This is as a result of the fact that they are considered the most disadvantaged, vulnerable and above all, credit worthy. And once women are aware that they are the target of these banks they are more likely to demand formal credit than their male counterparts.

Household size is another variable that has been identified to be an important determinant of the demand for formal credit in empirical studies. Chen and Chivakul (2008) found that household size was a significant determinant of demand for formal credit. They explain that this finding was reasonable as individuals with larger household size are more likely to have a higher dependency ratio which will increase their credit needs making them more likely to demand formal credit. The result however contradicts with Messah and Wangai (2011) who found that entrepreneurs with larger household size are less likely to borrowed credit from a formal financial institution compared to those with smaller family size. They explain that larger household size implies more consumption needs resulting in less ability to save income and making subsequent repayment of loan limited. With limited ability to repay loan, larger households are less likely to demand formal credit.

The importance of farmers' educational level as a determinant of the demand for formal credit is widely recognized in the literature. This was supported by studies such as Heffernan and Pollard (1983), Bendig*et al*. (2009) and Awunyo-Vitor and Abankwah (2012). For instance, Awunyo-Vitor and Abankwah (2012) found farmers' years of education to be a positive and significant determinant of demand for formal credit. They defended this position by explaining that the decision to demand formal credit improves

with increased level of education as education enables individuals to understand and follow policies and procedures of formal financial institutions. The same study revealed a positive and significant relationship between engagement in other income generating activities aside farming and demand for formal credit. They explained this finding by arguing that engagement in other income generating activities serve as surety for loan repayment for formal financial institutions. As such farmers who engage in other income generating activities are sure that in times of crop failure, they will be able to repay with income from these other sources which increase their likelihood of demanding formal credit.

Yahuala's 2008 study of small scale farmers' access to credit found farm size to be a significant and positive determinant of formal credit demand. He explained that farmers who own larger farm size have more needs for credit to enable them cover labour and inputs cost as such more likely to demand formal credit. Barslund and Tarp (2008) found that more assets increase the probability of demand for credit from the formal credit market. They concluded that the finding is consistent with productive assets giving more opportunities for investments and therefore increasing demand for credit from formal sources. Consistent with this finding, Awunyo-Vitor and Abankwah, (2012) found the value of farmer assets to have a positive and significant influence on demand for formal credit. They explain their finding by arguing that the delivery of formal credit is primarily based on collateral security which is enhanced by acquisition of assets. Hence farmers with more assets are more likely to demand formal credit as they are sure that they will be able to provide collateral to formal financial institutions in order to secure loan. Equally important in the determination of formal credit demand is hired labour employed by farmers. This was supported by Heffernan and Pollard (1983) who pointed out that farmers who hire labour exhibit a higher

degree of managerial ability and hence, the willingness and ability to adopt new technology making them more likely to demand credit.

2.4.2 Empirical Studies on the Demand and Determinants of Informal Credit Demand

Empirical studies on informal credit demand point to a wide range of credit providers within the informal credit sector (Atieno, 2001, Awunyo- Vitor and Abankwah, 2012; Owusu-Antwi and Antwi, 2011and Aryeetey and Udry, 1997). These studies identify the sources of informal credit to include friends and relatives, money lenders, trade creditors, susu collectors, landlord and other sources that fall outside of formal financial institutions.

The importance of informal credit providers in satisfying the credit needs of enterprises and individuals especially farmers in developing countries is well supported by empirical studies. A study by Ateino (2001) on formal and informal institutions' lending policies and access to credit by small-scale enterprises in Kenya found that about 67% of enterprises obtained credit from informal sources with major providers being friends and relatives and ROSCA. Moreover, Zeller (1994) observed that over 90% of households obtained their credit from the informal source with friends and relatives serving as the most frequent sources of credit. Given the important role played by the informal credit sources as a provider of credit, a number of studies have been carried out to investigate factors that affect individual's demand for informal credit.

Recent empirical studies have revealed the important influence of individual demographic as well as socio-economic factors in the demand for informal credit. Demographic factors identified to have significant influence on the demand for informal credit include sex of the

farmer, household size, marital status and education. For instance, Awunyo-Vitor and Abankwah (2012) established that males are more likely to demand informal credit as compared to their female counterparts. They attributed their finding to the fact that women control few assets and cultivate smaller acreages with low productivity. As such their ability to repay loan is limited making them less likely to demand informal credit because their chances of obtaining credit is low as the informal lender will only grant credit to client who can repay.

Zeller (1994) found that the probability of applying for informal credit increases with age but at a decreasing rate but however failed to argue to defend his finding. Of equally important as a determinant of demand for informal credit is household size. Zapata (2006) found household size to have a positive and significant effect on the entrepreneur's propensity to demand loan from informal lenders. He explains his finding to mean that an increase in the household size leads to an increase in the demand for consumption funds. However, borrowers are aware that there is high probability of default when loans are used for consumption instead of productive purposes, which will lead to the loss of collateral if credit is obtained from the formal source. As such borrowers with large family size will tend to borrow from the informal source where collateral is not required. In addition, Zapata (2006) found that married entrepreneurs are also more likely to borrow from informal lenders. He explains this finding by arguing that the need for consumption fund is greater for married individuals and since consumption fund is unproductive, informal lenders will be the preferred source of funds.

Farmers' educational level has also been found to be a significant determinant of the demand for informal credit. Nwaru et al., 2011 study of the determinants of informal credit

demand and supply among food crop farmers in Nigeria found farmers' years of education to be a significant and positive determinant of the demand for informal credit. They supported their result with explanation that, educated farmers are more amendable to risk taking than non-educated farmers because they are better equipped to evaluate and understand improved production techniques which enhance their adoption of these technologies. In an attempt to adopt these technologies however, farmers may require capital which increases their likelihood of demanding credit. However, in a review of the study of credit decision and rationing rules among informal lenders, Zapata (2006) found education to have a negative and significant relationship with the probability of applying for a loan from an informal lender. This implies that entrepreneurs who have obtained more years of formal education are less likely to borrow funds from informal lenders. He attributed this finding to the fact that educated individuals understand the concept of effective interest rate better than the less educated individual. Accordingly, they will opt for the formal financial institutions that offer lower effective interest rates making them less likely to demand informal credit.

Farm size and the level of agricultural commercialization have also been found by empirical studies to have influence on the demand for informal credit by farmers. Elhiriaki and Ahmed (1998) in particular, found farm size to have a significant but negative relationship with the demand for informal credit, suggesting that it is smaller farmers who participate more in the informal loan market in order to expand their farm size. Awunyo-Vitor and Abankwah (2012) found the level of agricultural commercialization to have a positive and significant influence on the demand for informal credit. They argue that as informal lenders offer credit to farmers they tend to favour those who produce for market since it serve as an indicator of their ability to repay. Accordingly, farmers who sell a larger proportion of their

produce are more likely to demand informal credit once they are aware that they will be granted credit by the informal lenders.

Awunyo-Vitor and Abankwah (2012) found that engagement in other economic activities in addition to farming exhibit positive and significant relationship with demand for informal credit. They explain their result to mean that farmers who engage in other economic activities are aware that if they are not able to pay with income from farming they can rely on income from other economic activities to repay the loan which increase their probability of demanding informal credit. Mohieldin and Wright (2000) in a study of formal and informal credit markets in Egypt found that the ownership of assets significantly influence the demand for informal credit. They explained that the result was reasonable as assets can be used as collateral for securing loan. In contrast, studies by Elhiriaki and Ahmed (1998) and Burslund and Tarp (2008) found value of assets to have a significant and negative influence on the demand for informal credit. They contend that larger assets can easily be converted into cash when the need for credit arises hence, a lower probability of demanding credit from the informal sector. Awunyo-Vitor and Abankwah (2012) however found no significant relationship between value of assets and demand for informal credit. They explained that informal credit delivery is largely based on social reputation and relationship and not on asset as collateral.

2.4.3 Empirical review on the relationship between Formal and Informal Credit Demand

Empirical studies have revealed that there indeed exists some complementary and substitution relation between demand for formal and informal sector credit. While some studies (Mohieldin and Wright, 2000; Aryeetey and Gockel, 1991; Aryeetey, 1992) have

revealed from their studies that formal and informal credits serve as both substitutes and complements, others (Okurut*et al*., 2004; Awunyo-Vitor and Abankwah, 2012) revealed that they either substitute or complement each other. For instance, Aryeetey and Gockel (1991) working on domestic resources for capital formation in Ghana using 1000 market women came to the conclusion that the inefficiency in the banking system led to the growth of an innovative informal sector that served both as a complement and a substitute to formal credit facilities.

Aryeetey's 1992 study of the relationship between formal and informal sectors of financial markets in Ghana, added to the debate that formal and informal credits serve as both substitute and complement to each other. He explained that many people who normally use the services of the formal sector, such as urban public-sector employees, also sometimes use the services offered by the informal sector to complement what they have received from the formal sector. They also sometimes make a substitution if the price of credit from the informal sector is lower, as will be the case in borrowing at near-zero interest from friends. Mohieldin and Wright (2000) maintain that formal and informal credits sometimes serve as complements for some category group of people and substitute for some other groups.

Studies such as Okurut*et al*., (2004) and Awunyo-Vitor and Abankwah (2012) found a one way relationship between the demand for formal and informal credit. For example Okurut*et al*., (2004) note that due to constraints associated with accessing formal credit, Ugandans substitute informal credit for formal credit. On the contrary, Awunyo-Vitor and Abankwah (2012) also established that for maize farmers in the Ashanti and Brong Ahafo regions of Ghana, formal and informal sector credits are complements.

From the above discussions, it is clear that formal and informal credits may substitute or complement each other depending on the situation in the credit market. If the two credit sources are available, the individual may apply for both in a complementary manner or substitute the expensive credit for the cheaper one.

2.5 Conclusion

From the review discussed above, it is revealed that the major sources of credit to farmers in low-income countries are formal and the informal credit sources. Also based on the above review, it is evident that individual demographic factors (sex, age, household size, marital status, education) and socio-economic characteristics (level of agricultural commercialization, hired labour, farm size total value of assets, engagement in other economic activities) are some of the major determinants of demand for formal and informal credit. While some of these factors may have differing effects on the demand for formal credit relative to informal credit, others may have the same effect.

The review also shows that there exist some complementary and substitution relationship between the demand for formal and informal credit depending on the situation in the credit market. While in some cases formal and informal credits may be demanded for in a competitive manner in other cases they may be demanded in a complementary manner.

It is interesting to note that, there has not been any empirical literature that has studied the demand side of the credit market of rice farmers in the Northern Region of Ghana. The present study therefore aims at filling this gap by examining the sources of formal and informal credit to rice farmers, the determinants of demand for formal and informal credit by rice farmers with particular emphasis on farm level characteristics and also try to ascertain whether formal and informal credits are substitutes or complements to rice farmers in the Northern Region of Ghana where such a study has not been carried out.

CHAPTER THREE

OVERVIEW OF THE FINANCIAL SYSTEM IN GHANA

3.1 Introduction

This chapter briefly discusses the structure of the financial systems in Ghana. It is divided into four sections. Section one looks at the nature of the financial sector in Ghana, section two looks at the types of financial sectors and the various actors in these financial sectors, section three looks at the linkages between the formal and informal financial institutions in Ghana and section four looks at trend in agricultural credit in Ghana.

3.2 The Structure of the Financial Sector in Ghana

Ghana's financial sector is divided into three sub-sectors comprising the formal, semi-formal and informal reflecting different legal and banking regulations guiding their operations (Osei-Assibey, 2011). However the formal and informal financial sectors are the two major sectors that are widely recognized in the discussion of financial markets in Ghana (Aryeetey and Gockel, 1991, Aryeetey, 1992). These financial sectors are reported to be growing in number (Aryeetey, 2008) and differ in terms of their operations, services they provide and their target population.

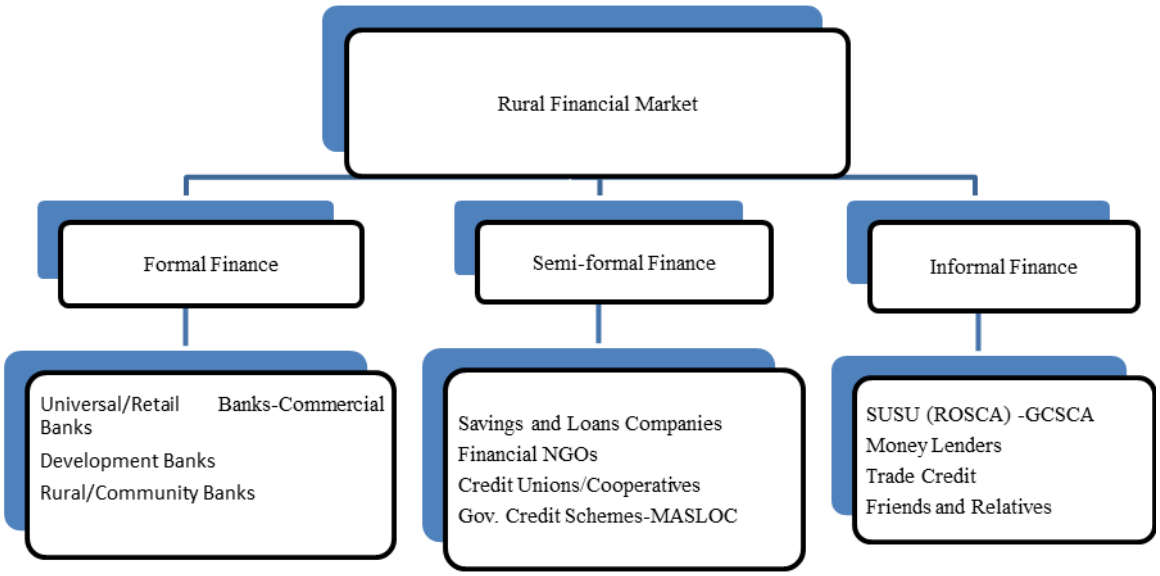
Formal financial institutions in Ghana are licensed by the Bank of Ghana under the Banking Law 1989 (PNDCL 225) to provide financial services under the Bank of Ghana regulations (Steel and Andah, 2003). Informal financial sector on the other hand involves savings and lending activities taking place outside of formal or established financial institutions (Aryeetey and Gockel, 1991). Their activities embrace all financial transactions that take place beyond the functional scope of banking and other financial sector regulations (Owusu-Antwi and Antwi, 2010). Semi-formal financial sector refers to those financial institutions that are formally registered but not licensed by Bank of Ghana (Steel and Andah, 2003).

Their activities are not regulated under the financial sector regulations of Ghana. They fall between the formal and informal financial markets and include credit unions, savings and loans companies, government credit programmes and other credit schemes run by non-governmental organizations.

According to Owusu-Antwi and Antwi (2010) the formal banking sector in Ghana does not satisfy the growing needs of demand for credit and many borrowers turn to informal loan sources. It is therefore argued that integrating the formal and informal financial sectors and ensuring effective linkages between them can improve the efficiency of the financial system by enabling different agents within these financial sectors to specialize for different market niches. This will facilitate the flow of credit up and down the financial sector (Aryeetey, 2008).

Figure 1 below gives a summary of the structure of the financial sector in Ghana.

Figure 1: Structure of the Financial System in Ghana



Source: Osei-Assibey (2011)

3.2.1 The Formal Financial System

The formal financial sector in Ghana embraces activities of banks. This financial sector has undergone various legislative transformations in terms of policies and numbers since 1897 when the British Bank of West Africa was established (Bawumia, 2010). The need for these transformations arose as a result of changing economic environment and financial needs of citizens of the country. For instance, as part of government desire to use the banking system to drive development, a number of development banks such as the National Investment Bank (NIB) and the Agricultural Development Bank were established in 1963 and 1965 respectively (Bawumia, 2010).The aim of the National Investment Bank was to assist in the development of the industrial sector while the Agricultural Development Bank was to assist in the development of the agricultural sector.

With support from the International Monetary fund and the World Bank, the Financial Sector Adjustment Programme (FINSAP) was initiated in 1988 as a strategy to move the Ghanaian formal financial sector from an era of financial repression towards one of financial liberalization (Bawumia, 2010). This included the removal of interest rate ceilings, abolishing of directed credit and credit controls, restructuring of seven financially distressed banks, development of money and capital markets and the move towards indirect and market determined instruments of monetary policy.

Currently, the institutional structure of the formal financial sector in Ghana is composed of Bank of Ghana which is the Central Bank of the country, Class 1 Banks, General Banks, ARB Apex Bank and Non-Bank Financial Institutions (NFBIs) (Mawuli, 2009). The number of Banks as at December 2012 reached 27 with 900 branches throughout the country (Bank of Ghana, 2012).

Formal banks in Ghana are characterized by relatively high value and longer term duration loans which require formal application and collateral (Jones et al, 2000). As such, these banks mostly transact business with relatively large corporate entities because they believe that it is easier and more profitable to deal with this segment of the market, as risk is minimal (Aryeetey, 2008). It has however been pointed out that these banks are reluctant in terms of credit provision to farmers (Owusu-Antwi and Antwi, 2010).

According to Osei-Assibey (2009) formal banks in Ghana have renewed their efforts to broaden access by reaching out to the new and vast markets of the unbanked. However, there is over concentration of these efforts in the urban centres, especially in the southern geographical areas of the country to the neglect of the north and rural communities. For instance, despite the modest increase in formal bank branches, the Northern region still lacks behind in terms of bank branches. The number of bank branches in Ghana reached 900 as at December 2012, of which 33 representing 3.7% are located in the Northern region (Bank of Ghana, 2012).

3.2.1.1 Rural and Community Banks

In 1976, the Ghanaian government, through the Bank of Ghana, established Rural Banks to channel credit to productive rural ventures and promote rural development (Obeng, 2008). This was because the banking system in the 1970_s was developing to the exclusion of the rural population (Bawumia, 2010).

The Rural and Community Banks (RCBs) are owned by members of the rural community through equity and are licensed to provide financial intermediation in the rural areas. The aim of RCBs is to mobilize savings and provide credit facilities in rural areas that are not being serviced by commercial banks. These banks expanded rapidly in 1980s. However,

poor financial management, weak supervision and natural calamities led to deterioration of the financial viability of rural banks (Steel and Andah, 2003).

The Association of Rural Banks (ARB) was founded in 1981 as an NGO with the intention of strengthening and promoting the concept of rural banking. The geographic spread of RCBs coupled with the extra diligence required in monitoring them has initiated the setup of the ARB Apex Bank in 2001, which is promoted by the ARB and is owned by RCBs. The Apex Bank serves as the head-office for all its affiliates in its network and performs functions such as check clearing, treasury management, product development and training.

The aims of RCBs among other things are to stimulate banking habits among rural dwellers, to mobilize resources locked up in the rural areas into the banking systems to facilitate development and to identify viable industries in their respective catchment areas for investment and development.

ARP Apex Bank reports a total of 133 RCBs with 439 branches across all ten regions of Ghana (ARB Apex Bank limited, 2012). It is worth mentioning that the Northern region continuous to lack behind even in terms of rural bank distribution. Out of a total number of 439 rural bank branches in Ghana only 3 branches are located in the Northern region (ARB Apex Bank limited, 2012).

3.2.2 Semi-Formal Financial Institutions

Semi- formal financial systems are formally registered but are not licensed by the Bank of Ghana. They include Non-Governmental Organizations (NGOs), Savings and Loans Companies, Government Credit Schemes and the Credit Unions (CUs) (Osei-Assibey, 2011). NGOs are incorporated as companies limited by guarantee (not for profit) under the Companies Code. Their poverty focus leads them to relatively deep penetration to poor

clients using microfinance methodologies, though mostly on a limited scale. They are not licensed to take deposits from the public and hence have to use external (usually donor) funds for micro credit.

Credit Unions (CUs) were first introduced in Ghana by Roman Catholic fathers working in the Northern part of the country in 1955 (Aryeetey and Gockel, 1991). Specifically it was established at Jirapa in the Northern Region (now Upper West) (Quanoo, 1997).These Credit Unions are cooperative thrift societies which are established in both rural and urban communities and work places (Andah, 2005). The objective of the Credit Unions was to encourage thrift and savings among members (farmers, traders, processors and non-agricultural workers) for productive ventures to improve their socio-economic lives(Egyir, 2010). A credit union normally provides intermediation (savings and loans facilities) only to its members, although some are looking to provide financial services more widely in their communities (Andah, 2005).

CUs were brought under legislation in 1968 and the Credit Union Association (CUA) was formed as an apex body, with 254 CUs (64 of them rural) with some 60,000 members (Quainoo 1997). CUs are reported to be performing weakly financially due in large part to their organization as cooperative societies with a welfare focus, and in particular to their policy of low interest rates on loans.

Individual members make predetermined periodic deposits into their accounts and may borrow up to two times their savings balance. Most CUs require borrowers to provide security, in addition to being in good standing with their deposits (Steel and Andah, 2003). Ideally, this can be in the form of a guarantee from another member of the credit union who has adequate uncommitted savings balance (Steel and Andah, 2003). Despite the fact that CUs were first established in Northern Ghana their operations are limited in this area. For

instance, Anim *et al.*, (2008) study of spatial and socio-economic dimension of clients of microfinance institutions found no client for CUs in the Northern region.

Savings and loans companies (SLCs) emerged in the late 1980s as providers of target group oriented financial services. They operate under the Financial Institution (Non- Banking) law 1993 (PNDCL 328) (ISSER, 2011). Between 1990 and 1993, BOG issued regulations aimed at enhancing the screening and monitoring of SLCs. The activities of SLCs are however limited in the Northern region of Ghana. For instance, in a study conducted by Peprah and Muruka, (2010), only 5.9% out of a total number of 17 SLC was located in the Northern region in Ghana.

3.2.3 Informal Financial Sector in Ghana

Informal financial sector comprises less formalized financial providers (actors) such as money lenders, traders, landlords, rotating savings and credit associations, susu collectors and relatives and friends (Aryeetey, 2008 and Owusu-Antwi and Antwi, 2010). It is this large variety of actors that causes difficulties in characterizing the nature and structure of demand for financial services in the informal sector (Aryeetey and Gockel, 1991).

The activities of each actor differs slightly from the other in terms of amount of loan provided, interest rates charged and loan duration. To simplify issues however, researchers often ignore these differences and classify these actors into a single composite unit as informal sector activities (Aryeetey and Gockel, 1991 and Awunyo- Vitor and Abankwah, 2012). Research has revealed that the informal financial sector mobilizes about 45 percent of all private sector financial savings in Ghana (Aryeetey and Gockel, 1991).

According to Aryeetey (2008), many analysts see informal finance as a consequence of inadequate formal financial systems and expected that financial sector reforms will lead to a decline of informal finance. This however needs to be treated with some reservation as the informal sector in Ghana continues to grow and adapts itself to changing situations without losing its major characteristic of flexibility (Aryeetey, 1992) in spite of the financial reforms that have been embarked upon. On the contrary, the informal financial sector in Ghana drives its dynamism from developments within the formal sector and also from its internal characteristics (Aryeetey and Gockel, 1991).

To varying degrees, informal credit in Ghana is reported to be characterized by easy access, flexibility in loan use, rapid processing, flexibility in interest rates and collateral requirements (Aryeetey, 2008). Agents in the informal financial sector are however reported to be restricted in the size, duration of lending and in their area of operations (Aryeetey, 2008). Informal credit transactions in Ghana can be grouped into non-commercial transactions, such as transactions between relatives and friends or small-scale group arrangements, and commercially based ones, conducted by savings collectors, estate owners, landlords, traders, and moneylenders (Owusu-Antwi and Antwi, 2010).

3.2.3.1 Actors in the Informal Financial Sector in Ghana

Moneylenders

Moneylenders are one of the key actors in the informal financial segment. They are known to be significant commercial lenders, often lending from surplus income earned from farming or trading. Credit from this source is however noted to be expensive and therefore, often serves as a last resort. However, long-standing clients who have established credit worthiness are charged a lower interest rate than those who are first entering the market

(Owusu-Antwi and Antwi, 2010). Loans from moneylenders typically average 3 months and rarely are made for more than 6 months though some borrowers may take longer time to repay (Steel and Andah, 2003).

Aryeetey and Gockel (1991) identified two major categories of moneylenders. They are the moneylenders who are licensed to operate under the Moneylenders Ordinance of 1951and those lenders who do business without official authority. The moneylenders in Ghana are reported to advance loans at interest rates higher than the banks but without collateral, and disburse loans very quickly if the client is known (Jones *et at*, 2000).The high prices of rural credit are attributed to monopoly profits accruing to moneylenders.

Aryeetey(1992) documents that, there is little demand for credit from the proprietary moneylender for investment in economic activity. He added that, enterprises that are likely to borrow from proprietary moneylenders for investments are either involved in trading in urban areas or farming where rather small sums are required for a season. According to IPC (1988) cited in Aryeetey (1992), the demand for credit facing the moneylender in Ghana is price inelastic in view of the fact that such credit is required in emergencies, forcing the borrower to take any given interest rate. The amount lent out by money lenders to clients may first depend on the relationship between the lender and the client, the capacity of the borrower to repay and on the lending capacity of the lender (Aryeetey and Gockel, 1991).

Aryeetey (1992) pointed out that moneylenders in Ghana have superior knowledge about their clients and as such, more open use could be made of them in channelling formal credit to light-risk borrowers. For this, moneylenders could be permitted to operate as agents of banks, and thereby lend within given interest-rate ranges that ensure them adequate profits.

Through this, banks may reduce their risk burdens by sharing this with the moneylender and improve upon the management of credit since the moneylender possesses superior knowledge of clients (Aryeetey, 1992).

Susu Collectors

Susu collectors are informal finance providers who supply households with short-term and flexible financial products. Susu collectors are not subject to regulation and hence, saving with them can be quite risky (Owusi-Antwi and Antwi, 2010). A participant who engages in susu collection system has to save with a susu collector for several months in order to prove his trustworthiness, as well as his cash flow, before being allowed to borrow. Based on the style of operation, the susu collector has to visit his or her clients everyday to collect a fixed amount of money depending on the client's cash flow for a period of 31 days. The daily contributions of a customer are recorded in a savings account. The total amount of the contribution is paid in a lump sum while the susu collector keeps one day's contribution as a fee for his services (Owusi-Antwi and Antwi, 2010).

Additional money is earned by the susu collector from either reinvesting his client's contributions in short-term projects or from depositing the contributions at a commercial bank, and receiving interest from the savings account. The same style of operation and fees is earned when a susu collector bequests a credit to a customer. In this respect an amount of money is drawn from the customer's daily contributions and is repaid through daily susu contributions afterwards (Owusi-Antwi and Antwi, 2010). Advances made by individual susu collectors to their regular clients are usually low value, very short term usually less than one month, provided on an interest-free basis without collateral and disbursed immediately (Jones et al, 2000).

The Ghana co-operatives of 'susu' collectors Association was established in 1994 to coordinate the activities of all regional susu collectors. However, evidence has shown that there is limited operation of susu collectors in the Northern Region. For instance, out of a total number of 1259 susu companies in Ghana, the Northern region can boost of only 6.8% (Peprah and Muruka, 2010). Also, in a review of the study of spatial and socio-economic dimensions of clients of microfinance institutions in Ghana, Annim et al., (2008) found no client for susu collectors in the Northern Region.

Relatives and Friends, Landlords and Traders

Relatives and friends, landlords and traders also play very significant role as providers of credit in the informal financial sector in Ghana (Ekumah and Essel, 2001; Owusu-Antwi and Antwi, 2010). Relatives and friends are known to be the most common providers of credit in the informal sector and usually charge near-zero interest rates (Aryeetey, 1992).This credit source is small, however, and the total credit from these non-institutional sources is insufficient to implement rural development programs (Owusu-Antwi and Antwi, 2010).

3.3 Linkages between Formal and Informal Credit Sectors of Financial Markets in Ghana

While the financial market in Ghana is extensively segmented, the demand for credit facilities in one sector is not exclusive to that sector (Aryeetey, 1992). It has been observed that in some situations, the application for formal credit competes with the application for informal credit in the finance of businesses while in other cases the two credit sources are applied in a complementary manner by businesses. The informal credit suppliers also sometimes act as intermediaries between formal lenders and borrowers (Aryeetey, 1992).

There is however, very limited competition between formal and informal credit suppliers, born out of the limited ability of both to put credit on the market, which does not help borrowers to improve their welfare by negotiating on the two markets, and therefore denies them access to well-priced investable funds (Aryeetey, 1992).

According to Aryeetey (1992) different demand and supply structures for each sector would ensure the continued segmentation of the market and have a bearing on the relationship between them. He pointed out that the actions of lenders depend on the amount of information they have about their clients and the enforcement power they possess. It is the different degrees of information and enforcement power that enables formal and informal lenders to approach borrowers differently.

It has been observed that credit from informal sources would be sought after failure to obtain bank credit and this is usually attributed to the fact that bank credit is much cheaper than credit from informal sources (a possible exception being credit from friends/relatives) (Aryeetey, 1992). It is reported that, the different financial markets exist as a result of the different conditions and requirements of the population, which may lead to either complementary or competitive situations (Aryeetey, 2008).

3.4 Agricultural Credit

The importance of credit to the development of the agricultural sector of the country has been recognized even before independence when the British Bank of Gold Coast was established in 1953 to serve the needs of farmers as part of their objectives (Bawumia, 2010). Subsequently, the Agricultural Development Bank and the Rural Banks were established in 1961 and 1976 respectively to provide credit to the agricultural sector as part of their objectives (Steel and Andah, 2003 and Bawumia, 2010). More recently, the Ghana

Shared Growth and Development Agenda has also emphasized the expansion in credit provision to farmers which is to be achieved through the Central Bank promotion of building up of capacities and provision of incentives to various financial institutions (NDPC, 2010).

Despite the increased emphasis by governments to increase credit allocation to the agricultural sector, evidence has shown the reluctance on the part of banks to lend to the agricultural sector (Owusu-Antwi and Antwi, 2010).According to Osei-Assibey (2009), rural banks set up to mobilize and advance finance to rural areas where farming is their major occupation, have virtually stopped expanding their branch network to these areas.

Many bankers regard lending to agriculture sector as high-risk ventures in view of the relative high risk of default in those sectors (Aryeetey and Gockel, 1991).This is evidence in the persistent decline in credit allocated by Deposit Money Banks (DMBs) to the agricultural sector between the periods of 2005 and 2008. Only the periods 2009 and 2010 experienced an increase. In 2011 there was another fall in credit allocation to the agricultural sector from 6.13% in 2010 to 5.74% in 2011 (ISSER, 2011).Table 3.1 shows the allocation of credit to the agricultural sector between the periods of 2005 to 2011.

Table 3.1: Allocation of Credit to Agricultural sector by DMBs (%) (2005-2011)

Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
% of credit allocation	6.70	5.40	4.90	4.30	4.74	6.13	5.74

Source: ISSER, 2011

Owusu-Antwi and Antwi (2010) point out that, the sources of credit for small-scale farmers in Ghana are mainly non-institutional often provided by local moneylenders. They however indicated that this non-institutional credit is costly and incapable of expansion.

CHAPTER FOUR

THEORETICAL FRAMEWORK AND METHODOLOGY

4.0 Introduction

This chapter describes the theoretical framework employed in the study followed by the presentation of the methodology to achieve study objectives. This chapter has five (5) sections. The theoretical framework is discussed in the next section. Section 4.2 discusses the estimation techniques followed by the justification of the explanatory variables in the model in Section 4.3. The estimation technique employed is discussed in Section 4.4. Finally, the data sources and types, sampling size and sampling technique are discussed in Section 4.5.

4.1 Theoretical Framework

Following previous studies (e.g. Mpuga, 2008, Balogun and Yusuf, 2011), the framework for our analysis of the determinants of rice farmers' demand for formal and informal credit is the theory of consumer behavior. The study adopts the model used by Balogun and Yusuf (2011). Accordingly, the study specifies the demand for credit function as:

$$DCi = f(Hi, Qi) \quad \ldots\ldots (4.1)$$

Where

DCi is the demand for credit by farmer i,

H is a vector representing individual demographic characteristics including sex, age, level of education, marital status and household size, Q represents socio-economic characteristics

such as farm size, hired labour, level of agricultural commercialization, value of assets, other economic activities of rice farmer and the district of farmer.

4.2 The Estimation Models

This section presents the technique applied for empirical estimations in this study. These are the probit and the bivariate probit models.

4.2.1 The Probit Model.

The choice of an econometric model for analysis depends mostly on the nature of the dependent variable. In situations where the dependent variable, ***Y*** is quantitative, our objective is to estimate its expected or mean value given the values of the regressors. In models where ***Y*** is qualitative, the objective is to find the probability of something happening. Hence, qualitative response regression models are often known as probability models (Gujarati, 2005). For this study, either a farmer demand credit or does not, which is a qualitative response. The binary regression model is often used for such studies. Three approaches are often involved in developing a probability model for a binary response variable**.** These are the linear probability model (LPM), the logit model and probit model (Gujarati, 2005).

Following from Balangun and Yusuf (2011), the binary probit model through the maximum likelihood estimation method is employed in this study. The probit model is preferred to the linear probability model (LPM) because the LPM does not constrain the probabilities to lie within the range of **0** and **1** since the ordinary least square estimation can give results where y_i**>1** or y_i**<0**.

By applying the probit model, we assume that the decision of an individual to demand credit or not depends on a latent variable, y_i, that is determined by one or more explanatory variables, x_i. The theoretical model is specified as

$P_i = P(y_i^* < y_i)$

$P_i = P(y_i^* < \beta_0 + \beta_i X_{ji}) = F(y_i)$

$$P_i = F(y_i) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Zi} e \frac{s^2}{2} ds \quad \text{..... (4.2)}$$

To obtain information on z_i, the utility index, we take the inverse of **(4.2)** to obtain:

$$yi = F^{-1}(Pi) = \beta_0 + \beta_i x_i + \mu_i \quad \text{..... (4.3)}$$

Where F^{-1} is the inverse of the normal cumulative density function (**CDF).**

Translating the model in equations **(4.3)** into a real world problem, the study hypothesizes that sex, age, marital status**,** educational level, household size, total value of assets, level of agricultural commercialization, engagement in other economic activities, farm size, hired labour and the district of farmer play vital roles in the demand for credit by rice farmers in the Northern Region of Ghana.

4.2.2 The Bivariate Probit Model

Following previous studies (for instance Mohiedin and Wright, 2000; Barslund and Tarp, 2008; Awunyo- Vitor and Abankwah, 2012), the bivariate probit model will be used to study the differing effects of individual and farm characteristics on the demand for formal

credit relative to informal credit demand and to ascertain whether any simple correlation exists between the decisions of farmers to borrow from the formal credit source and that of informal credit source. The framework of the bivariate probit model allows for correlation of the equations' disturbance term (Baum, 2006) which helps to test for complimentarily or substitutability.

To know whether formal and informal credits are substitutes or complements we check whether the correlation coefficient ρ(rho), which is a statistical indicator of the relationship between the two decision processes (the decision to demand credit from the formal and informal credit source) is statistically significant from the bivariate probit estimate result. If it is significant then we conclude that there is indeed correlation between the decision to borrow from formal and informal source. But to know the kind of decision, we look at the sign of the coefficient of ρ(rho) if it is negative we conclude that formal and informal credit are substitutes and if it is positive we conclude that they are complements. Following Baum (2006), the theoretical model of the bivariate probit in its simplest form may be written as:

$$y_1^* = X_1\beta_1 + \mu_I \quad \text{(4.4)}$$

$$y_2^* = X_2\beta_{2+}\ \mu_2 \quad \text{(4.5)}$$

$$\begin{pmatrix}\mu_1\\ \mu_2\end{pmatrix} \sim N\left\{\begin{pmatrix}0\\0\end{pmatrix} \cdot \begin{bmatrix}1 & P\\ P & 1\end{bmatrix}\right\} \quad \text{(4.6)}$$

Where, the observable counterparts to the two latent variables $y_1^* and y_2^*$ are $y_1 \, and \, y_2$ respectively. These variables are observed as '1' if their respective latent variables are positive and '0' otherwise. As in the regression content the two probit can be

viewed as a system and estimated jointly if $\rho \neq 0$, but it will not affect the consistency of individual probit equations estimates. β_1 and β_2 are unknown parameter vectors of equation 4.4 and 4.5 respectively, X_1 and X_2 are a (k*1) vector of explanatory variable and μ_1 and μ_2 are random error terms of equation 4.4 and 4.5 that are jointly bivariate normal (BVN).

4.3 Justification for Choice of Variables used in the Study

This section provides an explanation for the choice of variables used in this study. Review of literature on the factors influencing individuals demand for credit and the focus of the study motivated the choice of the variables. The variables considered include farmers' demographic as well as socio-economic factors. In addition the dependent variable is also described in this section. These variables are explained below.

4.3.1 Dependent Variables

This section gives a brief description of the dependent variables used in this study. These dependent variables are the overall credit demand, formal credit demand and informal credit demand. These variables are explained below.

4.3.1.1 The overall credit demand

The overall demand for credit takes the value of '1' for farmers who demand credit in the 2011/2012 production year and '0' otherwise. For this study, a farmer is said to demand credit if he/she borrows for rice farming, had a loan application rejected, did not borrow because of reasons such as high interest rates, had not repay previous loan or is not aware of any credit institution otherwise would have borrowed. On the other hand a farmer is said not to be demanding credit if he/she did not borrow because he/she had no need for credit.

4.3.1.2 Formal credit demand

Formal credit demand takes the value of '1' for farmers who borrowed formal credit in the 2011/2012 production year and '0' otherwise.

4.3.1.3 Informal credit demand

Formal credit demand takes the value of '1' for farmers who borrowed formal credit in the 2011/2012 production year and '0' otherwise.

4.3.2 Independent variables

Sex of the farmer (SEX): It is a dummy variable which takes the value of '1' if farmer is a male and '0' otherwise. Following previous studies, the effect of sex on credit demand cannot be determined a priori. For instance, Awunyo-Vitor and Abankwah (2012) established that males are more likely to demand credit as compared to their female counterparts. They attributed their findings to the fact that women control few assets and cultivate smaller acreages with low productivity thereby resulting in lack of collateral on the part of women to serve as collateral security for demanding credit. On the contrary, Malapit (2012) found that women are more likely to demand loans compared with men due to the fact that gender norms assign women greater responsibility for bridging day-to-day gaps in household consumption which may increase their financial obligation making them more likely to demand credit than their male counterparts. Therefore the effect of sex on the demand for credit cannot be determined a priori.

Age of farmer: It is a continuous variable defined as farmers age at the time of interview measured in years. Age has been identified as a significant determinant of demand for credit. For instance, Mpuga (2008) point out that following the life-cycle hypothesis, the

young and energetic individuals with an ambition to earn higher incomes, are expected to be more active in terms of saving/dis-saving in order to accumulate wealth. Consequently, the young may tend to save and/or borrow more for investment while the old may be less inclined to save/borrow. Therefore age is expected to have a negative relationship with the demand for credit.

Household size: This refers to the number of people in farmers household. According to Chen and Chivakul (2008), individuals in larger families are more likely to borrow than those in smaller families as the larger families are more likely to have a higher dependency ratio which will increase their credit needs. Therefore the demand for credit by farmers is expected to vary directly with the household size.

Marital status: It is a dummy which takes the value of '1' if a farmer is married and '0' otherwise. According to Mohieldin and Wright (2000), married individuals are more likely to demand credit than unmarried. This is because they are more likely to have large dependency ratio which will increase their financial burden and hence the need to borrow. Therefore the study hypothesized that married individual are more likely to demand credit than the unmarried.

Education of farmer: This is a continuous variable measured as the number of years of education attained by a farmer. Heffernan and Pollard (1983) document that, the more educated a farmer is the more his ability to understand the importance of modern technologies and improved seed varieties. This will result in the farmer demanding more credit to enable him purchase modern equipment and improved seed varieties so as to

increase yield. It is therefore expected that more educated farmers are more likely to demand credit.

Engagement in other economic activities: This is a dummy which takes the value of '1' if a farmer engages in other income generating activities aside rice farming. Heffernan and Pollard (1983) argue that farmers who have a reliable stream of income from off-farm employment, may be under less pressure to increase farm production hence are less likely to demand credit for farming. Furthermore, they added that income from off-farm employment increases the farm household's internal liquidity providing more capital with which to undertake farm level activities or innovations which will negatively influence the probability of demanding credit by farmers. The study therefore expects this variable to vary negatively with the demand for credit by rice farmers.

Value of assets: This is measured as the total value of durable and farm assets owned by the farmers. According to Heffernan and Pollard (1983) a strong assets position can be very attractive to lenders concerned with securing collateral for loan. Individuals with high assets value are therefore more likely to demand credit since they have assets to use as collateral to secure loan. Therefore, value of assets is hypothesized to have a positive influence on the demand for credit by farmers.

Agricultural commercialization: This is measured as a percentage of total output sold by the farmer. Heffernan and Pollard (1983) claimed that more commercialize farmers will like to maintain production at high level in order to increase marketable surplus by continuously upgrading their farm operations. This frequently requires credit for working capital hence making more commercial farmers more likely to demand formal credit. Therefore degree of

commercialization is hypothesized to have a positive relationship with the demand for credit by farmers.

Farm size: It is a continuous variable measured as the total size of land in hectares cultivated for rice by the farmers. Yahuala (2008) maintains that the larger the cultivated land size the more the labour required that demands additional capital that might be obtained through credit. Therefore the study hypothesized that farmers who cultivate larger size of land will utilize more capital and hence more likely to demand credit.

Hired labour: It is a dummy variable which takes the value of '1' if farmer employ the services of hired labour and zero otherwise. Heffernan and Pollard (1983) maintain that, considering the costs and returns to hired labour in choosing among alternative production strategies, farmers who hire labour are more likely to demand credit than those who do not employ the services of hired labour. Therefore hired labour is expected to vary directly with the demand for credit.

Tolon: It is a dummy variable which takes the value of '1' if farmer resides in the Tolon-Kumbungu district and '0' if farmer resides in the Tamale metropolis. This is included to capture district differences in the demand for credit by farmers.

Table 4.1 gives a summary of the variables discussed above including their units of measurements and their expected signs.

Table 4.1: Variables Definitions, Unit of measurements and hypothesize sign

Definition	Unit of measurement	Expected sign on the overall credit demand	Expected sign on formal credit demand	Expected sign on informal credit demand
Dependent Variables				
Demand for overall credit	Dummy (1 if farmer demanded credit, otherwise 0)			
Demand for formal credit	Dummy (1 if farmer borrowed credit, otherwise 0)			
Demand for infomal credit	Dummy (1 if farmer demanded credit, otherwise 0)			
Independent Variables				
Sex of respondent	Dummy (1 if farmer is a male, otherwise 0	-/+	-/+	-/+
Age of farmer	Years	-	-	-
Household size	Number of people in farmer's household	+	+	+
Marital status of farmer	Dummy (1 if farmer is a married, otherwise 0)	+	+	+
Farmer's level of education	Number of years of schooling	+	+	-
Agricultural commercialization	Measured as a Percentage of total output sold by farmer	+	+	+
Other economic activity of farmer	Dummy (1 if farmer engage in other economic activities, 0 otherwise	_	_	_
Farmsize of farmer	Measured in hectares)	+	+	+
Value of assets of farmer	Ghana cedis	+	+	+
District of farmer	Dummy (1= Tolon-Kumbungu, 0=Tamale metropolis)	-/+	-/+	-/+

Source: Author's compilation from literature

4.4 The Model for Empirical Estimation

Following Mohiedin and Wright (2000), the bivariate probit estimation technique is specified empirically as:

$$y_{1_i}^{*} = \beta'_1 x_{1_i} + \varepsilon_{1_i} y_{1_i} = \begin{cases} 1 y_{1_i}^{*} \geq 0 \\ 0 y_{1_i}^{*} < 0 \end{cases} \quad \text{.....(4.7)}$$

$$y_{2_i}^{*} = \beta'_2 x_{2_i} + \varepsilon_{2_i} y_{2_i} = \begin{cases} 1 y_{2_i}^{*} \geq 0 \\ 0 y_{2_i}^{*} < 0 \end{cases} \quad \text{..... (4.8)}$$

$$(\varepsilon_{1_i}, \varepsilon_{2_i}) \sim BVN(0, 0, 1, 1_p)$$

$y_{1_i}^{*}$ = propensity of a farmer to demand formal credit

y_{1_i}= observed farmers who demand formal credit

$y_{2_i}^{*}$ = Propensity of a farmer to demand informal credit

y_{2_i}= observed farmer who demand informal credit

$x_{1_i}$and x_{2_i}= list of explanatory variables with β'_1 andβ'_2being their respective parameter vectors; and $\varepsilon_{1_i}$and ε_{1_i}= random error terms that are jointly bivariate normal (BVN). The bivariate- probit considersx_{1_i}variables to be the same as x_{2_i}variables. The lists of explanatory variables to be used are identical to ones in the probit model.

4.5 Data Sources and Types, Sampling Size and Sampling Technique

This section presents the data sources and type, sampling size and technique.

4.5.1 Data Sources and Type

Primary data was collected in the month of March, 2013. Survey questionnaires containing a consent form and structured questions were administered to rice farmers to capture the main socio-economic characteristics and information on farmers' demand for credit. Specifically, it captured themes on households' demographics including education, sex, age, credit amount, interest, collateral, time of loan repayment, farm income and wealth as well as information on rice farming activities.

4.5.2 Sampling Technique and Sample Size

A multistage sampling technique was used to select rice farmers in the Northern Region. This region was chosen because of its relatively large contribution to total rice output in Ghana for the 2011 cropping year as compared to the other regions. Due to time and resource constraints 200 rice farmers were selected to be used as case study. The first stage involved a purposive sampling of the two (2) highest rice producing districts in the 2011/2012 production year consisting of Tamale Metropolis and the Tolon-Kumbungu districts. The second stage involved the use of simple random sampling to select ten (10) communities from each of the two districts and finally selecting ten (10) respondents from each community.

Within the Tamale Metropolis, the district office of the Ministry of Food and Agricultural was the first point of call where agricultural officers in charge of operational areas were contacted. These officers gave list of the 10 rice producing communities within the Tamale Metropolis. Ten farmers were then randomly selected from each community by field researchers. For Tolon–Kumbungu district, the assembly men of the communities took field officers around 10 rice producing communities where 10 farmers were randomly selected from each community by field researchers. Given the fact that the regional office of MOFA could not provide a list of rice farmers within these districts, field officers moved from house to house in each of the 20 community to identify rice farmers and subsequently administered the questionnaires. Table 4.2 shows the distribution of sample units according to districts and communities.

Table 4.2: **Distribution of sample units according to Districts and Communities**

District	Community	Sample size	Percentage
Tolon-Kumbungu	Ghulahgu	10	5
	Saakuba	10	5
	Golinga	10	5
	Tolon-Kpalsogu	10	5
	Kumbungu-Kpalsogu	10	5
	Chanzegu	10	5
	Tinguli	10	5
	Daasoyili	10	5
	Wuba	10	5
	Kanhanfehi Yili	10	5
Tamale Metropolis	Nyerizie	10	5
	Kulnyevula	10	5
	Kasalgu	10	5
	Gukpegutua	10	5
	Kootingli	10	5
	Signaayili	10	5
	Young Daphem Yili	10	5
	Chanzeni	10	5
	Baglahi	10	5
	Pagzaa	10	5
Total	**20**	**200**	**100**

Source: Field Survey, 2013

4.5.3 Data Analysis

The data collected were analysed using STATA and SPSS. In particular, SPSS was used to present the descriptive statistics. STATA 12 on the other hand, was used to present the result of the probit and bivariate probit analysis.

4.5.4 Study Area

The Northern Region where the study was conducted is the largest administrative region in Ghana in terms of land area. It covers approximately 30% of the entire land area of Ghana (Stacey, 2006). The area of research however, covers only two (2) districts in the Northern Region comprising of the Tamale Metropolis and the Tolon-Kumbungu district. Major economic activities engage in these districts are farming, artisan and trading. The districts have been selected for the study because they appear to be the highest producers of rice in the Northern Region based on the 2011 production figures as indicated in Table 4.3. Almost every community within these districts produces rice except that their level of production differs.

The Northern Regional capital, Tamale is located within the Tamale Metropolis and as such there are a number of formal banks operating within this district. However, within the Tolon-Kumbungu District there are no established banks. It is only the Rural Bank officials who visit communities within this district on weekly basis to provide financial services to interested members.

Formal sources of credit in the study area include among others Ghana commercial bank, Agricultural Development Bank, Stanbic Bank, Fidelity bank, Amal Bank, Ecobank, and the Rural Banks. Informal credit sources on the other hand include susu collectors, money lenders and friends and relatives.

Table 4.3: Production of Rice in the Northern Region-2011 (Figures in Metric Tonnes)

DISTRICT	OUTPUT	PERCENTAGE
Bole	1,012	0.6
Bunkpurugu/Yunyoo	389	0.2
Central Gonja	2,088	1.2
East Gonja	9,521	5.6
East Mamprusi	1,645	1.0
Gushiegu	7,062	4.1
Karaga	3,960	2.3
Nanumba North	1,057	0.6
Nanumba South	1,878	1.1
Saboba/Cheriponi	3,376	2.0
Savelugu/Nanton	29,511	17.2
Sawla/Tuna/Kalba	2,613	1.5
Tamale Metro	45,138	26.4
Tolon/Kumbungu	36,177	21.1
West Gonja	2,091	1.2
West Mamprusi	13,704	8.0
Yendi	7,110	4.2
Zabzugu/Tatale	2,961	1.7
Total	**171,293**	**100**

Source: Statistics, Research and Info. Directorate (SRID), MOFA, 2012

CHAPTER FIVE

RESULTS AND DISCUSSION

5.1 Introduction

This chapter presents and discusses the results of the study. The chapter is divided into three major sections. Section 5.1 presents an overview summary statistics of demographic and socio-economic characteristics of survey rice farmers and data profile of rice farmers' level of demand for credit. Section 5.2 presents the sources and characteristics of loan obtained by surveyed rice farmers. In section 5.3, the results of econometric analysis of the determinants of overall demand for credit as well as the determinants of formal and informal credit demand are presented and discussed.

5.2 Demographic and Socio-economic Characteristics of Surveyed Rice Farmers

The descriptive statistics of demographic and socio-economic characteristics of surveyed rice farmers are presented in Table 5.1. From Table 5.1, the age distribution of the survey rice farmers records an average age of 42.8 years. Their ages however range from a minimum of 20 years to a maximum of 71 years. Majority are within the age bracket 20-35 years and 5.5% are 65 years and above. Generally, 94.5% are within the economically active age group which represents a potential for the rice industry in Northern Ghana. Out of the 200 farmers interviewed, 82.5% were men and 17.5% women.

Table 5.1 Demographic and Socio-economic Characteristics of Surveyed Rice Farmers

Characteristics	Mean	Min.	Max.	Frequencies	Percentages
Age	42.78	20	71		
• 20-35 years				78	39
• 36-50 years				69	34.5
• 51-65 years				42	21
• 65+ years				11	5.5
Sex					
• Male				165	82.5
• Female				35	17.5
Marital Status					
• Married				174	87
• Otherwise				26	13
Educational Status in years	1.53	0	14		
• Ever been to school				32	16
• Never been to school				168	84
Household size	10.28	4	15		
• 1-5 people				5	2.5
• 6-10 people				108	54
• 11+people				87	43.5
Religious Status					
• Muslims				186	93
• Christians				13	6.5
Farm size (hectares)	1.6	0.2	26.33		
• 0-1.9 ha				160	80
• 2+ha				40	20
Other economic activities					
• None				25	12.5
• On-farm (Non-rice)				143	71.5
• Trading				6	3.0
• Artisan				20	10
• Others				6	3.0
Labour status					
• Family labour only				59	29.5
• Hired labour only				0	0
• Family/Hired labour				141	70.5
Value of assets in GH₵	3383.4	47	100502		
Agricultural commercialization (%)	50.05%	0	100%		

Source: Field Survey, 2013

The reasons for the low representation of women are because most of the women work for their husbands as family labour and also concentrate on processing of paddy rice instead of farming. It is also observed from Table 5.1 that 87% of respondents are married. The rest of

the respondents (13%), are divorced (1.5%), widowed (5%), separated (3%), in consensual union (0.5%), or are never married (3%). Furthermore, it is evident from Table 5.1 that majority of respondents (84%) have never been to school. This finding reflects the situation in Ghana where a greater proportion of members of farm households has never been to school or drop out of school as they climb the educational ladder. This phenomenon has negative impact on rice production in the region especially in the area of adoption and utilization of appropriate productive enhancing technology.The average of household size is observed to be 10.28 and ranges from a minimum of 4 to a maximum of 15. However, majority (54%) of farmers have household size of between 6 to10. Each farmer belongs to one of the three main religions in Ghana. However, majority (93%) of them are Muslims, followed by 6.5% Christians and 0.5% traditionalists.

The average farm size of the surveyed rice farmers is 1.6 hectares. This however ranges from a minimum of 0.20 hectares to a maximum of 26.33 hectares. Moreover, survey data indicates that 80% of rice farmers are smallholders cultivating on less than 2 hectares (MOFA, 2011). This represents a threat to rice production since small farm size means smaller output all other things being equal. From Table 5.1, it is observed that only 12.5% of rice farmers engage in rice farming as their major occupation. The rest of rice farmers are either engaged in other on-farm (non-rice) production (71.5%), trading (3%), artisan (10%) or into other income generating activities (3%). This implies that majority of farmers do not devote all their efforts into rice farming and that total rice output from the region could be more than what is currently being produced if farmers concentrated on rice farming as their major occupation. From Table 5.1, 29.5% of farmers reported of using only family labour, 70.5% said they use both hired and family labour and no farmer reported using only hired labour. This implies that all rice farmers in one way or the other use family labour which

reflects the importance of family labour to rice farmers. From Table 5.1, it is observed that the mean total asset value of rice farmers is 3383.4. It however ranges from a minimum total assets value of GH₵47.00 to a maximum of GH₵100502.00. Also, Table 5.1 shows a mean agricultural commercialization of 50.05%, a minimum of 0% and a maximum of 100%.

5.3 Borrowing Status of Surveyed Farmers

According to the survey, 47% of surveyed farmers borrowed while 53% did not borrow. However, Table 5.2 indicates that 41% of farmers borrowed for rice farming activities which represents low level of borrowing while 6% borrowed for other purposes. The reasons for the low level of borrowing for rice farming may be due to few or inaccessible credit sources.

Table 5.2: Borrowing Status of Surveyed Farmers

Description	Frequencies	Percentage
Borrowers		
• For rice farming	82	41
• Other purposes	12	6
Non-Borrowers	106	53
Total	**200**	**100**

Source: Field Survey, 2013

5.3.1 Main Reasons for Farmers not Borrowing

The survey further revealed two groups of farmers who did not borrow for their rice farming activities. They are those who have ever borrowed but did not borrow for the 2011/2012 production year and those who have never borrowed. Among those who have ever borrowed, some borrowed for rice farming while others borrowed for other purposes.

Table 5.3 indicates that among farmers who did not borrow for the 2011/2012 production year,18.9% have ever borrowed for rice farming, 11.3% have ever borrowed for other purposes and 69.8% have never borrowed for their rice farming.

Table 5.3: Borrowing status of farmers who did not borrow for their rice farming

Description	Frequencies	Percentages
Have ever borrowed		
• Rice farming	20	18.9
• other purposes	12	11.3
Have never borrowed	74	69.8
Total	**106**	**100**

Source: Field Survey, 2013

Farmers who have ever borrowed for rice farming (18.9%) and those who have never borrowed for rice farming (69.8%) as indicated in Table 5.3 were further questioned on the reasons for not borrowing. This is aimed at getting the number of farmers who actually demand credit. Credit demand does not only comprise those who actually obtained a loan but also includes farmers who had loan application rejected as well as those who did not apply for some other reasons though they needed credit. Table 5.4 presents the reasons why farmers did not borrow.

Table 5.4: Reasons for Farmers not Borrowing

Reasons	Has ever borrowed but did not borrow for the 2011/2012 Production year (Frequency)	Has never borrow for rice production (Frequency)	Total	Percentage
Never had a need for loan	12	26	38	41.3
Application was rejected	2	7	9	9.8
Lack of collateral	0	17	17	18.5
Interest rates too high	1	2	3	3.3
Had not repaid previous loan	4	0	4	4.3
Not aware of any credit institution	0	19	19	20.7
Fear that might not be able to pay	1	1	2	2.1
Total	**20**	**72**	**92**	**100**

Source: Field survey, 2013

Of the farmers who did not borrow in 2011/2012, 41.3% did not do so because they had no need for the loan. The rest of the farmers (58.7%) did not borrow though they had a need for a loan because of other reasons. Major reasons for not borrowing were due to lack of collateral (18.5%) and not being aware of any credit institution (20.7%). This implies that there is a need for sensitization of farmers on lending institutions available from which they can borrow.

5.4 Credit Demand for Rice Farming by Surveyed Rice Farmers

From Table 5.5, it is observed that 33% of survey farmers had no demand for credit while the rest 67% demanded credit. Based on this we can conclude that demand for credit is fairly high among these farmers. Among farmers who were found to be demanding credit, 41% actually borrowed credit as indicated in Table 5.5 while the rest of credit demanders (26%) did not borrow. Major reasons for not borrowing credit (though had demand for credit) were lack of information on which credit institution to borrow (9.5%) and lack of

required collateral (8.5%).Lack of information on which credit institution to borrow appears to be a major reason for not borrowing. This confirms the results from earlier study by Ateino (2002) that lack of information is a major reason for not using credit facilities by small-scale enterprises in Kenya. From Table 5.5, it is clear that those farmers who did not apply because of high interest rates constitute the least number of credit demanders. Possible explanation for this could be that, farmers need credit for their farming activities and for that matter interest rates charged does not really matter to them.

Table 5.5: Credit Demand for Rice Farming

Description	Number of observations	Percentage
No credit demand	66	33
Credit demand		
• Had loan	82	41
• Application rejected	9	4.5
• Lack of collateral	17	8.5
• Interest too high	3	1.5
• Not aware of any credit institution	19	9.5
• Had not repay previous loan	4	2
Total	**200**	**100**

Source: Field survey, 2013

5.4.1 Classification of Farmers based on Credit Demand Status

The survey further revealed four groups of respondents based on credit demand status. These comprise farmers who demanded credit for rice farming (134), farmers who did not demand credit (66), farmers who borrowed from the formal sector (25) and those who borrowed from the informal sector (57). One striking feature observed is that, no farmer is reported borrowing from both formal and informal source. A possible explanation for this could be that, farmers aim is to obtain credit for their rice farming activities and once they

are able to borrow from one credit source there is no need for them to borrow from the other credit source. This is consistent with the finding by Mohieldin and Wright (2000) who maintain that in Egypt, people who borrow from one credit source rarely also borrow from the other credit source for the same purpose, especially if the loan is for production purposes. Table 5.8 presents the mean values of some selected variables used for analysis of farmers who demanded credit, farmers who did not demand credit, formal credit borrowers and informal credit borrowers.

Table 5.6: Mean of selected characteristics of Surveyed rice farmers by credit demand status

	Mean Values			
Variables	Demand (134)	No demand (66)	Formal borrower (25)	Informal borrowers (57)
Age	42.3	43.7	42.6	40.7
Household size	10.8	9.1	11.1	11.3
Education in years	1.7	1.2	4.9	1.4
Agricultural commercialization (%)	52.9	44.1	58.1	60.9
Rice farm size in hectares	1.7	1.2	1.7	1.4
Value of assets (GH₵)	3737.3	2664.8	2998.7	2694.4

Source: Field survey, 2013

In Table 5.6, average household size is larger for those who demanded credit than those who did not demand credit. One possible explanation for this could be that farmers with large household size will have huge financial burden. This will make them demand credit in order to increase their farm size with the aim of commercializing so as to shoulder the huge financial burden placed on them. Also mean years of education turn to be slightly higher for farmers who demanded credit than those who did not. A plausible explanation for this observation could be that, more years of education enables farmers to understand and appreciate the importance of modern farm equipment which enhances their adoption of this

equipment. However, the adoption of this equipment requires capital which results in farmers with more years of education demanding credit.

Moreover, mean agricultural commercialization is higher for farmers who demand credit than those who did not demand credit. This may be because in order to have more marketable surplus that enhance commercialization farmers will have to increase the size of their farms and probably employ more labour. This will mean additional expenditure which results in farmers demanding credit. Also mean farm size is greater for farmers who borrow than those who did not borrow. One plausible reason for this could be that farmers with large farm size will turn to demand more labour and machinery to work on farms which require additional capital to undertake that can be meet through borrowing. Finally, mean value of assets are higher for those who demanded credit than those who did not demand credit. This is because assets serve as collateral security for securing loans and as such farmers who have more assets are sure that they have collateral to secure loans and as such turn to demand credit.

On the contrary, average age turn to be greater for farmers who did not borrow than farmers who borrowed. One explanation for this could be that as farmers grow older they will not have any incentive to increase production which will make them not demand credit.

Table 5.6 further presents the mean values of selected characteristics of farmers who obtained credit from the formal and informal sources. Comparing informal borrowers with formal borrower in Table 5.6, average level of agricultural commercialization and average value of assets are greater for informal borrowers than formal borrowers. This may be attributed to the fact that, informal lenders have better information about their client and hence tend to lend to those farmers who can repay. Since the level of agricultural commercialization and value of assets can serve as indicators of farmers' ability to repay,

more commercial farmers and farmers with higher value of assets will turn to demand informal credit than formal credit once they are sure that they will be granted credit by informal lenders.

On the other hand, mean age is greater for farmers who demand formal credit than those who demand informal credit. However there is no obvious explanation for this observation. Also mean years of education is greater for formal borrowers than informal borrowers. One reason for this could be that, farmers with more years of education are able to understand and fill loan papers of formal financial institutions and hence are able to obtain loans from this source. Finally mean farm size is slightly greater for formal borrowers than informal borrowers. One explanation for this could be that farmers with large farm size may have to employ additional labour and purchase farm equipment which requires huge capital outlay. However since the formal sector provides larger amount of loan as noted by Jones et al., (2000), farmers with large farm size tend to borrow more from the formal sector.

5.5 Sources and Characteristics of Loan

This section presents the various sources from which farmers obtained credit as well as the characteristics of loan such as loan amount, interest rates and collateral requirements.

5.5.1 Informal Sources of Credit

The assertion by Owusu-Antwi and Antwi (2010) that informal credit providers in Ghana serve as major sources of credit to farmers appears to be the case for rice farmers in the Northern region of Ghana. From Table 5.7 it is revealed that the informal credit source dominates as the major source of loan to rice farmers. Out of the total number of farmers who borrowed credit for rice farming, 69.5% of them obtained their loans from the informal

source. Limited availability and accessibility of formal credit might be one of the reasons for the dominance of the informal credit sources as providers of credit to rice farmers.

Despite the recognition of a large variety of informal credit providers in Ghana (Aryeetey and Gockel, 1991), friends and relatives and money lenders are the main providers of informal credit to rice farmers as revealed from the survey. Possible explanation for this could be that either the informal lenders such as susu and trade creditors among others are shying away from providing credit to farmers or there are limited numbers of informal credit options for farmers to borrow. The principal source of loans within the informal sector is friends and relatives supplying about 93% of all loans obtained from the informal sector. This confirms the assertion by Aryeetey and Udry (1995) that majority of lending within the informal sector occurs between relatives and friends. The dominance of friends and relatives as the major provider of informal credit could also be attributed to the fact that as other informal lenders such as trade creditors and agricultural input traders frequently supply credit to farmers, a time comes when farmers begin to regard these informal lenders as friends.

Money lenders were the least used (7%) which may be a reflection of their relative inaccessibility. Also, it is possible that farmers are shying away from money lenders given the high interest rates that they charge (Aryeetey, 1992) or money lenders are not willing to lend to farmers due to the perceived risky nature of agriculture. It is surprising to note that despite the wide recognition of the role of susu collectors as an informal credit provider, no farmer reports borrowing from this source. One plausible explanation for this observation could be that there is limited operation of susu collectors in this region. This goes to support earlier study by Anim et al., (2008) who found no client for susu collectors in the Northern region.

5.7 Informal sources of credit to Surveyed rice farmers

Source	Frequencies	Percentage
Friends and relatives	53	92.9 (64.6)
Money lenders	4	7.1 (4.9)
Total	57	100 (69.5)

Figures in parentheses are percentages of the total farmers who borrowed credit for rice farming (N=82)

Source: Field Survey, 2012

5.5.2 Formal Credit Source

In this study, the formal credit source is categorized into three (3). These are the Universal Banks (Ghana Commercial banks and Agricultural development bank), Rural Banks, and other formal sources (Savings and loans companies, NGOs, Government provided credit and Credit Union). Not a great proportion of loans originated from the formal sources as only 30.5% of total loans obtained were extended from the formal sources. The reasons for this observation could be that, since majority of farmers (84%) as indicated in Table 5.1 have never had any formal education, they tend to shy away from applying for credit from the formal sources since these sources require more papers to fill as noted by Togbe (2009). Also it is possible that the formal sector is refusing to lend to the farmers given the risky nature of agricultural production as noted by (Owusu-Antwi and Antwi, 2010). In the formal sector, the rural bank is the second most important source of credit by extending 28% of all loans obtained from the formal source as indicated in Table 5.8. This is not surprising as provision of credit to farmers is part of the objectives of Rural Banks in Ghana.

Table 5.8: Formal Sources of credit to Surveyed rice Farmers

Source	Frequencies	Percentage
Universal banks	5	20 (6.1)
Rural banks	7	28 (8.5)
Other formal source	13	52 (15.9)
Total	25	100 (30.5)

Figures in parentheses are percentages of the total farmers who borrowed credit for rice farming (N=82)

Source: Field Survey, 2012

5.5.3 Characteristics of Loan

From Table 5.9 it is revealed that the formal sector supplied a minimum loan amount of GH₵60.00, a maximum amount of GH₵4,000.00 and an average loan of GH₵877.8. The informal sector supplied a minimum amount of loan of GH₵30.00, a maximum loan amount of GH ₵2,000.00 and an average loan of GH₵244.21. From Table 5.9, it is observed that, the formal source supplied the maximum amount of loan which goes to confirm the assertion by Jones *et al*., (2000) that loans from the formal sector in Ghana are relatively high as compared to informal loans.

Table 5.9: Summary Statistics of Loan Amount

Loan Amount	Obs.	Min.	Max.	Mean	Std. Dev.
Formal source (GH₵)	25	60	4000.00	877.8	922.23
Informal source (GH₵)	57	30.00	2000.00	244.21	297.34

Source: Field survey, 2013

A further examination of the data revealed that about 80% of all loans obtained from the formal sources required collateral as shown in Table 5.10. However the type of collateral required has shifted from traditional requirement of physical assets such as land, cars and houses to personal guarantors. For instance 96% of farmers who borrowed from the formal source required guarantors as collateral while only (4%) required assets as collateral. For the informal sector 87.7% of loans obtained did not require collateral while only 12.3% required collateral. This goes to confirm the assertion that informal loans are given based on social relationship rather than physical collateral (Awunyo-Vitor and Abankwah, 2012).

Table 5.10: Summary of collateral and interest requirement

FORMAL SOURCE			**INFORMAL SOURCE**		
Collateral required	**Frequency**	**Percentage**	**Collateral required**	**Frequency**	**Percentage**
• Yes	20	80	• Yes	7	12.3
• No	5	20	• No	50	87.7
Total	**25**	**100**	**Total**	**57**	**100**
Interest paid			**Interest paid**		
• Yes	25	100	• Yes	33	57.9
• No	0	0	• No	24	42.1
Total	**25**	**100**	**Total**	**57**	**100**

Source: Field Survey, 2013

From Table 5.10, all farmers who borrowed from the formal source paid interest. For the informal sources however, 57.9% of farmers who borrowed paid interest on their loan. The rest (42.1%) did not pay any interest. One plausible explanation for this observation is that majority of the loans obtained from the informal source are from relatives and friends who are noted for supplying loans at zero interest rates among informal lenders.

5.6 Analysis of Empirical Results from Econometric Estimations

This section provides an interpretation of the regression results from the probit and bivariate probit estimates. The probit estimation result of the overall demand for credit is presented in Table 5.11. Table 5.12 presents the results of the bivariate probit estimates of formal and informal credit demand.

5.6.1 Probit Regression Estimates of Determinants of Credit Demand by Rice Farmers

The determinants of the overall credit demand (both formal and informal) by rice farmers in the Northern Region are estimated by the Probit estimation model and the results are displayed in Table 5.11. The model assesses the influence of age, sex, marital status, household size, education, agricultural commercialization, farmers' engagement in other economic activities, farm size, hired labour, total value of asset of farmer and the district of farmer on the demand for credit by farmers. From the Table, the model has a LR chi-square value of 67.87 which is statistically significant at 1%. This implies that the explanatory variables considered in the model jointly explain the demand for credit (dependent variable). The model also has a Pseudo R-squared value of 26.76%. This implies that about 27% of the variation in the demand for credit is explained by the explanatory variables.

The demand for credit by rice farmers is statistically influenced by 5 variables. These determining variables are household size, level of agricultural commercialization, engagement in other economic activities, hired labour and district dummy. Among these determining variables, 4 variables with definite expected signs assume their expected signs. Sex, age, marital status, educational status, farm size and value of assets are not statistically significant.

The coefficient of household size is positive and statistically significant at one percent. The interpretation is that farmers with larger household size are more likely to demand credit than those with smaller household size. The marginal effect shows that an increase in household size by one person will increase a farmer's probability of demanding credit by 8.3%. One possible reason for this finding may be attributed to the fact that a large household size increases the financial responsibilities and the farmer is more likely to demand credit to increase rice production with the aim of commercializing as a means of shouldering the huge financial burden imposed by the size of the household. Without demanding credit, farmers with larger household size would have huge financial constraint to engage in rice farming as a result of the huge responsibilities they face. This finding is consistent with Chen and Chivakul (2008) and Tang *et al.* (2010). Chen and Chivakul (2008) particularly argued that individuals in a large family are more likely to borrow than those in a smaller family as the large family is more likely to have a higher dependency ratio which increases the financial needs.

The coefficient of farmer's engagement in other economic activities in addition to rice farming has a significantly negative effect on the demand for credit. The coefficient which is significant at 1% means that, farmers who engaged in other economic activities in addition to rice farming are less likely to demand credit for rice farming. The decision to engage in other economic activities in addition to rice farming reduces the probability of demanding credit by 31.3%. The implication of this finding is that households who engage in other economic activities are not willing to demand credit for rice farming as a result of a possible diversion of funds from other activities into rice farming. This means that funds from other activities complement rice production such that farmers would not need to demand credit for rice farming. The risk-averse nature of most farmers could justify why

funds from other sources would reduce dependence on credit demand for rice farming. This finding is however not consistent with the findings by Awunyo-Vitor and Abankwah (2012) who found a significant and positive relationship between farmers' engagement in other economic activities and demand for credit. He explains that if the individual farmer is not able to pay with income from farming, they can rely on income from other economic activities to repay the loan which increases their probability of demanding credit.

The coefficient of the level of agricultural commercialization is positively related to the demand for credit and is statistically significant at 5%. This estimate meets its *a priori* expectation and means that farmers with higher levels of commercialization (that is, farmers who sell more of their produce) are more likely to demand credit. For a percentage increase in the level of agricultural commercialization, the probability of demanding credit increases by 0.2%. One plausible explanation for this observation is that, in order for farmers to increase their level of commercialization, they will have to increase their marketable surplus by either expanding their farm size or engaging in more mechanized agriculture production. These activities require capital to undertake making farmers with higher levels of commercialization more likely to demand credit. This observation is consistent with the assertion by Heffernan and Pollard (1983) that more commercialized farmers will like to maintain production at high level in order to increase marketable surplus by continuously upgrading their farm operations. This frequently requires credit for working capital hence making more commercialized farmers more likely to demand credit.

The coefficient of hired labour is found to be positive and significant at five percent. The coefficient which meets its *a priori* expectation means that rice farmers who employed the services of paid labour are more likely to demand credit than farmers who do not employ

the services of hired labour. For the decision to use hired labour the probability of demanding credit increase by 18.7%. One possible reason to support this observation is that, the expenditure on wage of hired labour is a factor that could drive farmers to demand credit.

The coefficient on the district dummy (Tolon) is negative and is significant at 5%. This means that rice farmers in the Tolon-Kumbungu District are less likely to demand credit as compared to their counterparts from the Tamale metropolis. Being in Tolon-Kumbungu District reduces the probability of demanding credit by 16.2%. A possible reason for this observation could be attributed to institutional disparities. That is, in the Tamale metropolis there are many formal credit sources in addition to informal credit sources as compared to the Tolon-Kumbungu District.

Table 5.11: Probit Regression Estimates of Determinants of Credit Demand (both formal and informal) by Rice Farmers

Dependent Variable: Credit demand (binary)

Variables	Coefficient	Standard Error	Marginal Effects
Sex	-0.227	0.334	-0.070
Age	-0.008	0.009	-0.003
Household size	0.256***	0.051	0.083
Married	-0.026	0.400	-0.008
Educational level in years	-0.001	0.032	-0.0004
Engagement in other economic activities	-1.649**	0.494	-0.313
Agricultural commercialization (%)	0.007***	0.003	0.002
Farm size in hectares	0.017	0.049	0.006
Hired labour	0.544**	0.236	0.187
ln assets	0.147	0.091	0.048
Tolon	-0.503**	0.241	-0.162
Con	-1.572	0.920	

Number of observations=200 **LR chi2 (11)=67.87** **Prob>chi 2=0.0000**

Pseudo R2=0.2676 **Log likelihood =-92.899981**

*, **, *** indicates statistical significant at 10%, 5% and 1% respectively

Source: Field survey 2013

5.6.2 Bivariate Probit Estimates of Determinants of Formal and Informal Credit Demand

The bivariate probit model is estimated to determine the differing effects of factors such as age, sex, marital status, household size, education, agricultural commercialization, farmers' engagement in other economic activities, farm size, total value of asset of farmer and the district of farmer on the demand for formal and informal credit by farmers.

The results of the bivariate probit regression as shown in Table 5.12 show a Wald chi-square value of 151.50 which is statistically significant at 1%. This implies that the explanatory variables considered in the model jointly influence the demand for both formal and informal credit.

The results suggest that demand for formal credit is significantly influenced by sex of the farmer, household size, farmers' years of education, level of agricultural commercialization and the district of the farmer. On the other hand, age, household size, farmer's years of education, level of agricultural commercialization, engagement in other economic activities in addition to rice farming and the total value of assets significantly influence famers demand for informal credit.

The coefficient of sex is negative and a significant determinant of formal credit demand at 5%. However, sex is not a significant determinant of the demand for informal credit which could be explained by the fact that informal lenders give credit on the basis of social reputation and relationship rather than on gender basis. In the case of the effect of sex on formal credit demand, the meaning of the negative and significant estimate is that women

are more likely to demand formal credit than men. Being a male decreases the probability of demanding credit by 13.2%.

Table 5.12: Bivariate Probit Estimates of Determinants of Formal and Informal Credit Demand

Bivariate probit regression		**Number of observations = 200**		
Log likelihood=-144.05366		**Wald chi2=151.50**	**Prob>chi2=0.000**	
Variables	**Demand for Formal credit**		**Demand for Informal credit**	
	Coefficient	**Marginal Effects**	**Coefficient**	**Marginal Effects**
Sex	-0.715**	-0.132	-0.105	-0.034
	(0.300)		(0.277)	
Age	0.011	0.001	-0.015*	-0.005
	(009)		(0.008)	
Household size	0.117**	0.016	0.135***	0.043
	(0.048)		(0.039)	
Married	0.690	0.064	-0.449	-0.156
	(0.427)		(0.349)	
Educational level in years	0.141***	0.019	-0.048*	-0.015
	(0.030)		(0.029)	
Engagement in other economic activities	-0.287	-0.447	-0.866***	-0.316
	(.338)		(0.288)	
Agricultural commercialization (%)	0.007*	0.001	0.010***	0.003
	(0.004)		(0.003)	
Farm size in hectares	0.039	0.005	-0.045	-0.014
	(0.047)		(0.041)	
ln assets	-0.124	-0.017	0.186**	0.059
	(0.112)		(0.089)	
Tolon	-1.055***	-0.148	0.207	0.066
	(0.310)		(0.215)	
Con	-2.088		-1.996	
	(0.930)		(0.760)	
/arthrho	-12.810	-0.030	0.972	
Rho	-1	1.20e-08	-1	1
Likelihood ratio test rho	Chi2(1)=26.776		Prob>chi2=0.000	

*, ** and***indicate statistical significance at 10%, 5% and 1% respectively. Figures in parenthesis are standard errors.

Source: Author's computation from Field survey, 2013

On plausible explanation for this finding could be that, the rural banks which supply credit on group basis was the second most important provider of formal credit. Women are however, easily able to organize themselves into groups which serve as collateral for securing formal credit making them more likely to demand formal credit. This is consistent with the finding of Akudugu (2012) who argued that most credit schemes designed by banks and other development institutions such as NGOs focus more on women as they are considered the most disadvantage, vulnerable and credit worthy.

Though age is not a significant determinant of demand for formal credit, it has a significant and negative relationship with the demand for informal credit. The estimate is statistically significant at 10% with demand for informal credit and means that younger farmers are more likely to demand informal credit than older farmers. An increase in farmers' age by one year will lead to a 0.5% decrease in farmers demand for informal credit. On plausible explanation for this findings could be that younger farmers are generally in their entry and expansion stage of farming and are therefore more aggressive to invest in farming hence are more likely to demand informal credit.

The coefficient of household size is positive and significantly related with the demand for both formal and informal credit. The estimates are statistically significant at 5% and 1% for formal and informal credit demand respectively. This means that farmers with larger family size demand both formal and informal credit than those with smaller family size. An increase in household size by one person will increase the probability of demanding formal and informal credit by 1.6% and 4.3% respectively. One plausible reason for this finding may be that a large household size increases the financial responsibilities and the farmer is more likely to demand credit (whether formal or informal) in order to increase rice

production with the aim of commercializing as a means of shouldering the huge financial burden imposed by larger household size. Without demanding credit, larger household sizes would have huge financial constraint to engage in rice farming as a result of the huge responsibilities they face. This finding is consistent with Chen and Chivakul (2008) and Tang *et al.* (2010). Chen and Chivakul (2008) particularly argued that individuals in a large family are more likely to borrow than those in a smaller family as the large family is more likely to have a higher dependency ratio which increases their credit needs.

Farmers' years of education is found to be significantly related with the demand for both formal and informal credits though the signs differ. The coefficient is significant at 1% for formal credit demand and means that farmers with more years of education are more likely to demand formal credit. An additional year of education increases the probability of demanding formal credit by 1.9%. One reason for this finding could be that, farmers with more years of education are able to read and understand the application procedure of formal financial institution which makes them more likely to demand formal credit. This finding meets its *a priori* expectation and is consistent with Togbe (2009) who maintained that formal credit requires more papers to fill and as such the probability of a person who is educated to take credit from the formal source is higher. However, education is found to be negatively related with the demand for informal credit. The coefficient is significant at 10% and means that farmers with more years of education are less likely to demand informal credit. An additional year of education significantly decreases the probability of farmer demanding informal credit by 1.5%. One reason for this may be that as farmers years of educational increases, they are able to read and understand the application procedure of formal financial institution and as such turn to demand formal credit which tend to reduce their likelihood of demanding informal credit. This finding is consistent with Burslund and

Tarp (2008) who found years of education to be a negative and significant determinant of demand for informal credit but however failed to defend their findings.

The coefficient of the level of agricultural commercialization is positive and significantly related with the demand for both formal and informal credit. The estimates are statistically significant at 10% and 1% for formal and informal credit demand respectively and mean that farmers who sell a greater percentage of rice are more likely to demand both formal and informal credit than those who sell small quantities of rice. For a percentage increase in the level of agricultural commercialization, the probabilities of demanding formal and informal credit increase by 0.1% and 0.3% respectively. One plausible explanation for this result is that higher levels of commercialization implies increasing marketable surplus which may require the farmers to either expand farm size, employ more labour or increase the use of inputs and machinery. All these activities require capital to undertake which increases the probability of demanding credit by more commercialized farmers. Also, another reason could be that farmers who sell a greater proportion of their produce are sure of getting money to repay the loan hence are more likely to demand credit. This observation is consistent with Awunyo-Vitor and Abankwah (2010) who found that the level of agricultural commercialization has a positive and significant influence on demand for credit.

Engagement in other economic activities in addition to rice farming is found to have a negative and insignificant relationship with the demand for formal credit. The results however show a significantly negative relationship between engagement in other economic activities and the demand for informal credit. The estimate which is statistically significant at 1% means that farmers who engaged in other economic activities are less likely to demand informal credit. For the decision to engage in other economic activities, the

probability of demanding informal credit falls by 31.9%. This may be attributed to the fact that as farmers engage in other economic activities, they are able to generate income from these sources which can be invested into their rice farming activities and as such has no need for informal credit which are often too small. Also high transaction cost involve in obtaining credit may prompt farmers to switch profits from other income generating activities into rice farming activities making them less likely to borrow informal credit. This is however inconsistent with Awunyo-Vitor and Abankwah (2012) who found positive and significant relationship between demand for informal credit and engagement in other economic activities.

Total value of assets of the farmer is not a significant determinant of formal credit demand. This may be attributed to the fact that 96% of all loans obtained from the formal sources required personal guarantor as collateral and not physical assets. Also majority of credit from the formal source were provided by the Rural Banks whose requirement for providing credit is that farmers organize themselves into groups and not on collateral as a basis for securing loans. Value of assets is however found to be a significant determinant of informal credit demand. The coefficient has a positive effect on the demand for informal credit and is statistically significant at 5%. This means that farmers with higher total value of assets are more likely to demand informal credit as compared to those with smaller values of assets. An increase in the total value of assets by GH₵1 increases the probability of demanding informal credit by 5.9%. The observation where total value of asset is significant for informal credit can be attributed to the fact that informal lenders have better information about their client and hence tend to lend to those farmers who can repay. Since a strong assets position can serve as an indicator of farmers' ability to repay, farmers with higher

value of assets are more likely to demand informal credit once they are aware they will be granted credit.

The district dummy, Tolon has a negative and significant relationship with the demand for formal credit. The estimate is significant at 1% and means that farmers who are in Tolon-Kumbungu district are less likely to demand formal credit as compared to their counterparts from the Tamale Metropolis. A plausible reason could be attributed to the disparity in formal credit institutions. Formal credit institutions are concentrated in the Tamale Metropolis which is likely to increase the demand for formal credit by farmers residing in the Metropolis. For informal credit demand the district dummy was positive but however not a significant determinant of informal credit demand.

It is therefore evident that household size, education and agricultural commercialization influence the demand for both formal and informal credit. However, formal credit demand is particularly influenced by sex and district dummy while informal credit is particularly influenced by age, farmers' engagement in other economic activities and assets value. There is therefore no specific pattern of influence of credit demand variables on formal or informal credit demand, as they are both influenced partly by some demographic factors and partly by some socio-economic factors. This is however inconsistent with the finding of Barslund and Tarp (2008) who concluded that the demand for formal credit is particularly driven by factors such as total land and to a lesser extent by red book status reflecting the need for credit for production and the management of assets whereas informal credit demand is positively dependent on the credit history (not paid) and on the number of dependants, reflecting household need to smooth consumption and address external shocks. One plausible reason for this result is that, while Barslund and Tarp (2008) was looking at

the demand for credit for both production and consumption purposes, this study only considers the demand for credit for rice farming purposes.

5.6.3 Substitutes or Complements

One of the statistical usefulness of the bivariate probit estimation technique is its ability to determine the nature and type of relationship that exist between the first and second equations. Following from this, the bivariate probit estimation technique is also used to determine whether the decision to borrow from the formal sector (first equation) has a relationship with the decision to borrow from the informal sector (second equation). Specifically, the nature/type of relationship of economic interest is whether the decisions to borrow from the formal and the informal sources are complements or substitutes.

From the bivariate probit result, the correlation coefficient, p (rho), which is a statistical indicator of the relationship between the two decision processes (the decisions to borrow from the formal and the informal credits sources) is statistically significant at one percent. This confirms that there is a correlation between the decision to borrow from the formal and the informal sources. The nature of the relationship is decided by the sign and the magnitude of the coefficient. From the results, the coefficient of p (rho) is -1. This coefficient specifies that the relationship between formal and informal credit sources is that of perfect substitutes.

The implication of this finding is that, either a farmer goes in for formal credit or informal credit. It also means that the two credit sources do not complement each other. Further, it means that the two sources are said to be mutually exclusive. This finding is supported by the fact that no farmer in the sample was found to borrow from both sources. One plausible

reason for this finding could be attributed to the low educational background of most farmers in the sample which makes it difficult to demand formal credit since they do not meet the requirements of such formal credit sources. Such farmers are only able to access informal credit sources for which they qualify for. Also, it may be that, farmers need credit for rice farming and once they are able to obtain credit from one credit source they do not have to borrow from the other credit source.

This finding is however inconsistent with the finding of Mohieldin and Wright (2000) and Awunyo-Vitor and Abankwah (2012) who found no correlation between the decision to borrow from the formal and informal source using the bivariate probit estimation technique. Mohieldin and Wright (2000) particularly explained that there was no interaction between having a loan in the formal sector and having an informal sector loan because informal sector was found to be acting as a complement for some categories of spending and as a substitute in others.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATION

6.1 Introduction

The purpose of this chapter is to provide summary and conclusions of the study, make policy recommendations and suggest areas for further research. Section 6.2 presents the summary of the study, 6.3 presents the conclusions, 6.4 presents recommendations and 6.5suggest areas for further research.

6.2 Summary

The study had the objectives of identifying the sources of credit to rice farmers, identifying and estimating the determinants of rice farmers' demand for formal and informal credit and ascertaining whether formal and informal credit are substitutes or complements to rice farmers.

A field survey was conducted in the month of March 2013 in which primary data were collected using a structured questionnaire. A multistage sampling technique was employed to select a total number of 200 rice farmers from two (2) districts comprising of Tamale Metropolis and Tolon-Kumbungu in the Northern Region of Ghana.

The study specified and estimated credit demand functions for the sample of 200 rice farmers comprising those who demanded credit and those who did not. Those who demanded credit was further separated into formal and informal credit demanders. Accordingly, a probit estimation method was used to estimate the overall determinants of credit demand while the bivariate probit estimation technique was used to jointly estimate the determinants of demand for formal and informal credit and to ascertain whether formal and informal credits are substitutes or complements.

6.3 Conclusions

A number of interesting findings emerged from the study. The study reveals that the sources of credit to rice farmers comprised of both the formal and informal sources. Formal sources included the Universal banks (Ghana Commercial Bank and Agricultural Development Bank), Rural Banks, and other formal credit sources (Savings and Loan Companies, Financial Non-Governmental Organization, Credit Unions and Government Credit Programmes). Informal credit sources on the other hand comprised friends and relatives and money lenders. However the informal sources serve as the major provider of credit as they supply 69.5% of all credit obtained by rice farmers with friends and relatives being the major (93%) informal credit provider.

Further, the study finds that the demand for credit for rice farming is fairly high as 67% of surveyed rice farmers demanded credit for rice farming. Out of the total number of farmers (134) who demanded credit, 61.2% borrowed while 38.8% did not borrow. The major reasons for not borrowing credit are lack of required collateral security (12.7%) and lack of information on which credit institution to borrow (14.2%).

The study further reveals that the overall demand for credit is significantly influenced by household size, agricultural commercialization and engagement in other economic activities in addition to rice farming, hired labour, and the district dummy of the farmer. Specifically, formal credit demand is significantly influenced by, sex, household size, education, agricultural commercialization and the district dummy. Informal credit demand on the other hand in addition to being negatively influenced by age and education, is positively influenced by household size, level of agricultural commercialization, engagement in other economic activities in addition to rice farming and value of assets.

From the bivariate probit result, the correlation coefficient, p (rho), which is a statistical indicator of the relationship between the two decision processes (the decisions to borrow from the formal and the informal credit sources) is statistically significant at one percent. This confirms that there is a correlation between the decision to borrow from the formal and the informal sources. The correlation coefficient p (rho) which determines the nature of the relationship is -1 implying that the relationship between formal and informal credit sources is that of perfect substitutes. This finding is supported by the fact that no farmer in the sample was found borrowing from both sources.

6.4 Recommendations

A number of observations emerge from the study which requires close attention in government and other stakeholders' efforts to increase rice farmers' demand as well as access to credit.

1. Level of agricultural commercialization is found to be a positive and significant determinant of the overall demand for credit as well as the demand for formal and informal credit. This means that farmers who sell more of their produce are more likely to demand credit than those who sell less of their produce. Hence government should formulate policies that will encourage rice farmers to be more commercially oriented by selling more of their produce which will increase their demand for both formal and informal credits. Policies such as provision of ready market and profitable sales prices for farmers' produce, increasing tariff on imported rice and making it mandatory for public institutions to patronize local rice will help encourage farmers to sell more of their produce which will increase their demand for

credit. Also government provided credit should target those farmers with high level of agricultural commercialization since they are more likely to demand credit.

2. Another conclusion drawn from the results of the study is that, education positively influences the demand for formal sector credit. The reason for this may be that, educated farmers are able to read and understand the lending procedures of formal financial institutions and also able to fill the loan application forms as formal financial institutions require more papers to fill. However, descriptive statistics of the survey revealed that majority of farmers (84%) had no formal education. Therefore in order to increase the demand for formal credit by farmers, the government and policy makers should initiate specific policies that will either mandate or motivate formal financial institutions to get representatives in rice producing villages explain to farmers their lending procedures and also assist farmers to fill loan application forms. By so doing the demand for formal credit by rice farmers will increase. Banks will however carry out this policy only if it is profitable to them, therefore government should provide incentives such as tax breaks, subsidies and grants to formal financial institutions in order to motivate them to carry out this policy. Also government should establish credit insurance schemes to protect formal financial institutions against rice farmers default especially in times of crop failure which will also serve as motivation for bank officials to assist farmers apply for credit thereby increasing rice farmers' demand for credit.

3. The result of the study revealed that formal and informal credits are substitutes for rice farmers. This implies that given that the two sources of credit are available, farmers will be willing to substitute one credit source for the other depending on

which credit source they find convenient to use in terms of cost and accessibility. However, since the informal sources of credit are less organized (especially with friends and relatives being the major providers of informal sector credit) as compared to the formal credit sources, regulating formal credit source may be easier than the informal credit source. Government should therefore concentrate on formulating policies that will make formal credit use convenient and accessible to farmers. By so doing, farmers will substitute informal credit for formal credit. This can be achieved by questioning potential credit demanders to know the problems that prevent them from borrowing credit from the formal sources before formulating credit policies aimed at increasing farmers' demand for and access to formal credit.

4. The study revealed that the informal credit sources dominate the credit market as the major providers of credit to farmers by supplying 69.5% of all credit obtained with the formal credit sources being the least (30.5%) providers of credit which may be a reflection of their relative unavailability or inaccessibility. However, given the well-established nature of formal credit institutions compared to informal credit sources (especially with friends and relatives being the major provider within the informal source), it will be easy for government to formulate policies that will regulate the formal credit institutions than the informal credit sources. Government should therefore take necessary steps to increase farmers' demand and access to formal credit by designing suitable policies to increase farmers' demand as well as access to credit from the formal source. In this regard, the role of the Agricultural Development Bank (ADB) in granting credit to farmers should also be critically assessed.

5. The study finds that the demand for credit for rice farming is fairly high as about 67% of surveyed rice farmers demand credit. However, descriptive statistics of the survey indicate that of the farmers who demanded credit, 38.81% did not obtain credit. This goes to confirm the assertion by earlier studies (Seidu, 2008 and Quaye *et al*., 2010) that rice farmers in the Northern Region have limited access to credit which is a constraint to their productivity. Against this background, the government can go ahead to design policies that will increase farmers' access to credit. Policies such as the creation of farmers' awareness on available credit institutions to borrow from and guaranteeing farmers to obtain credit from credit institutions could increase their access to credit since these were the major reasons why farmers did not borrow.

6.5 Areas for Further Research

The study covered only 2 rice producing districts out of 18 rice producing districts in the Northern region for the 2011 cropping year. Further research is therefore needed to cover more of the districts in order to give a more comprehensive picture of the demand for credit by rice farmers in the region.

Also the study limited itself to the study of demand side at the expense of the supply side of the credit market by soliciting information from rice farmers without soliciting information from credit providers within the credit market of farmers. For instance no information was collected on lending policies of credit providers and their target population. For effective design of policies however, it is important to consider both demand and supply side of credit market of farmers. Further studies should therefore try to conduct a joint analysis of the demand and supply side of credit market of rice farmers.

REFERENCES

Akudugu, M. A. (2012). Estimation of the Determinants of Credit Demand by Farmers and Supply by Rural Banks in Ghana's Upper East Region, *Asian Journal of Agriculture and Rural Development, 2*(2), 189-200.

Amidu, M. (2006). Link between monetary policy and bank's lending behaviour: The Ghanaian case. Banks and Bank Saving Systems Vol. 1

Andah, D. O. (2005). Regulation, Supervision, and Access to Microfinance: A case of Ghana. Essays on Regulation and Supervision, No.10, The Microfinance Regulation And Supervision Resource Center.

Annim, K. S., Awusabo-Asare, K. and Asare-Mintah, D. (2008). Spatial and Socio-economic dimensions of clients of microfinance institutions in Ghana, Journal of Geography and Regional Planning Vol.1 (5), pp. 08-096

Aryeetey, E. (1992). The relationship between the formal and informal sectors of the financial market in Ghana the African Economic Research Consortium, AERC Research Paper 10

Aryeetey, E. (2008). From informal finance to formal finance in Sub-Saharan Africa; Lessons from Linkage Efforts. Paper presented at the High-level Seminar on African Finance for the 21st Century Organized by the IMF institute and the Joint African Institute Tunis, Tunisia, March 4-5, 2008.

Aryeetey, E. and Gockel, F. (1991). 'Mobilizing Domestic Resource for Capital Formation in Ghana; The Role of Informal Financial Sector; AERC Research Paper, No. 3, AERC, Nairobi.

Aryeetey, E. (1992). The Relationship Between the Formal and Informal Sectors of Financial Markets in Ghana: African Economic Research Consortium Research paper 10.

Aryeetey, E. (1994). *Financial integration and development in Sub-Saharan Africa: A study of informal finance in Ghana* (Working Paper 78). London: Overseas Development Institute.

Aryeetey, E. and Udry, C. (1997). The characteristics of informal financial markets in sub-Saharan Africa. *Journal of African Economies*, 6, 1.

Asante, B. S., Afari-Sefa, V. and Sarpong, B. D. (2011) Determinants of small scale farmers' decision to join farmer based organizations in Ghana. *African Journal of Agricultural Research*, 6(10), 2273-2279

Atieno, R. (2001). "Formal and Informal Institutions' Lending Policies and Access to Credit by Small-Scale Enterprises in Kenya: An empirical assessment" *African Economic Research Consortium*, Nairobi, Research Paper 111.

Awunyo-Vitor, D. and Abankwah, V. (2012) Substitutes or Complements?: Formal and Informal Credit Demand by Maize Farmers in Ashanti and Brong Ahafo Regions of Ghana. *International Journal of Agriculture and Forestry, 2*(3), 105-112.

Bank of Ghana (2012). Available at http: //www.bog.gov.gh

Balogun, O. L. and Yusuf, S. A. (2011). 'Determinants of Demand for Microcredit Among the Rural Households in South-Western States, Nigeria. *Journal of Agricultural and Social Science*, 7, 41–48.

Barslund, M. and Tarp, F. (2008): Formal and Informal Rural Credit in Four Provinces of Vietnam: *Journal of Development Studies*, *44*(4), 485 - 503.

Briggerman, B. C., Towe, C. and Morehart, M. (2007). Credit Access: Implication for Sole Proprietor Household Production. Selected paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Portland.

Basu, S. (1992). Asymmetric Information, Credit rationing and the Stiglitz and Weiss model. Research paper No. 360.

Baum, C. F. (2006). Introduction to Modern Econometrics using stata

Bawumia, M. (2010). Monetary Policy and Financial Sector Reforms in Africa: Ghana's experience.

Bendig, M., Giesbert, L. and Steiner, S. (2009). Savings, Credit and Insurance: Household Demand for Formal Financial Services in Rural Ghana. German Institute of Global and Area Studies Working Papers, No. 94

Chen, K. C. and Chivakul, M. (2008). What drives household borrowing and credit constraints? Evidence from Bosnia and Herzegovina. IMF Working paper (European department) WP/08/202

Crook, J. and S. Hochguertel, (2005). "Household Debt and Credit Constraints: Evidence from OECD Countries," Credit Research Center, University of Edinburgh Working Paper Series No. 05/02.

Diagne, A., Zeller, M. and Sharma, M. (2000). Empirical Measurements of Households' Access to Credit and Credit Constraints in Developing Countries: Methodological Issues and Evidence; Food Consumption and Nutrition Division Discussion Paper 90. International Food Policy Research Institute, Washington, D.C.

Egyir, I. S. (2010). 'Rural Women and Microfinance in Ghana: Challenges and Prospects'.*Contributed Paper Presented at the Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference, Cape Town, South Africa.*

Elhiraika, A.B. and S.A. Ahmed. 1998. "Agricultural Credit Under Economic Liberalization and Islamization in Sudan". AERC Research Paper No. 79.

Ekumah, E. K. and Essel, T. T. (2001). Gender Access to Credit Under Ghana's Financial Sector Reform: A Case Study of Two Rural Banks in Central Region of Ghana. IFLIP Research Paper No 01-4, International Labour Organization.

Ghana Statistical Service (GSS, 2007). 'Pattern and Trends of Poverty in Ghana 1991-2006' A report prepared from the GLSS 5, GSS.

Gravelle, H. and Rees, R. (2008). Microeconomics. 3rd edition. Pearson Education Ltd.

Gujarati, D. N. (2005). Basic Econometrics. 4th edition. McGraw-Hill Book Company. New York

Heffernan, P. J and Pollard, S. K. (1983) The Determinants of Credit Use Among Small Farmers in Jamaica. Social and economic studies, *32*, (1), 23-41.

Hosseini, S.S., Khaledi, M., Ghorbani, M. and Brewin, D., G. (2012). An Analysis of Transaction Costs of Obtaining Credits in Rural Iran**.** *Journal of Agricultural Science Technology,14, 243-256.*

Institute of Statistical, Social and Economic Research (2011). The State of the Ghanaian Economy in 2010, ISSER, University of Ghana pp 28, 128-130.

IPC (GmbH). (1988). Rural finance in Ghana. A research study on behalf of Bank ofGhana, Frankfurt.

Islam, K. M., Sipilainen, T. and Sumelius, J. (2011). The influence of credit constraints on Technical, Allocative and Cost Efficiency in Peasant Farming in Bagladish. *European Journal of Scientific Research, 56* (2), 229-243

Jones, H., Sakyi-Dawson, O., Harford, N. and Sey, A. (2000) 'Linking Formal and Informal Financial Intermediaries in Ghana: Condition for Success and Implication for RNR development'. Natural resource perspectives No. 61

Kashuliza, A. K. and Kydd, J. G. (1996). Determinants of Bank Credit Access for Small Holder Farmers in Tanzania: A discriminant analysis application. *Savings and Development*, 3, 285–97.

Maddala, G. S. (2005). Limited Dependent and Qualitative Variables in Economics, Cambridge University Press. pp 223-228

Magri, S. (2002). "Italian Households' Debt: Determinants of Demand and Supply," Temi di discussione (Economic working Papers) 454, Bank of Italy, Economic Research Department.

Malapit, H. J. L. (2012). Are Women More Likely to be Credit Constrained? Evidence from Low-income Urban Household in the Philippines. *Feminist Economics, l18*, 3.

Messah, B. O. and Wangai, N. P. (2011). Factors that Influence the Demand for Credit Among Small-Scale Investors: A case study of Meru Central District, Kenya. *Research Journal of Finance and Accounting, 2*, 2.

MoFA. (2011). Facts and Figures. Statistics, Research and Information Directorate (SRID) of the Ministry of Food and Agriculture (MoFA), Accra-Ghana, January, 2011

Mohamed, K. (2003). Access to Formal and Quasi-Formal Credit by Smallholder Farmers and Artisanal Fishermen: A Case of Zanzibar. Research on Poverty Alleviation (REPOA). Research Report No. 03.6

Mohamed, K. S. and Temu, A. E. (2008). Access to Credit and its Effect on the Adoption of Agricultural Technologies: A case of Zanzibar.

Mohieldin, S. M., and Wright, W. P. (2000). Formal and Informal Credit Market in Egypt: *Economic Development and Cultural Change*, *48* (3), 657-670

Mpuga, P. (2008).Constraints in Access to and Demand for Rural Credit: Evidence from Uganda. A paper for presentation during the African Economic Conference (AEC) 12-14 November 2008, Tunis, Tunisia.

National Development Planning Commission (NDPC). 2010. Medium-Term National Development Policy Framework: Ghana Shared Growth And Development Agenda (GSGDA), 2010-2013 Volume I:

Nwaru, J. C., Essien, U. A. and Onuoha, R. E. (2011). Determinants of informal credit demand and supply among food crop farmers in AkwaIbom state, Nigeria. *Journal of Rural and Community Development, 129–139*

Obeng, S. K (2008). Rural banking in Ghana; Its impact on rural farmers (A case study of Abokobi rural area) Sanvin's research and consultancy unit

Oboh, V. U. and Ineye Douglas Ekpebu, I. D. (2011). Determinants of formal agricultural credit allocation to the farm sector by arable crop farmers in Benue State, Nigeria; *African Journal of Agricultural Research, 6*(1), 181-185.

Okurut, N., Schoombee, A., Van der Berg, S. (2004). Credit Demand and Credit Rationing in the Informal Financial Sector in Uganda. African Development and Poverty Reduction: The Macro-Micro Linkage. Forum Paper, 13-15, South Africa.

Ofori, E., Kyei-Baffour, N., Mensah, E. and Agyare, W. A. (2010). Yield Gap Analysis in Rice Production from Stakeholders' Perspective at Annum Valley Bottom Irrigation Project at Nobewam in Ghana. *Journal of Agricultural and Biological Science, 5, 6,* ISSN 1990-6145 ARPN

Osei-Asare, Y. B. (2010). Mapping of Poverty Reduction Strategy Papers (PRSPs), Sector Strategies and Policies Related to Rice Development in Ghana. Coalition for African Rice Development (CARD)

Osei-Assibey, E. (2009). Financial exclusion: What Drives Supply and Demand for Basic Financial Services in Ghana? Savings and development. Vol. 3

Osei-Assibey, E. (2011). Microfinance in Ghana: A Comparative Study of Performance of the Formal versus Informal Rural Financial Institutions. *Forum of International Development Studies, 40,* 210-232.

Owusu-Antwi, G. and Antwi, J. (2010). The Analysis Of The Rural Credit Market In Ghana. *International Business And Economics Research Journal*, 9, 8.

Peprah, J. A and Muruka, G. (2010). Factors Affecting the Distribution of Microfinance Institution in Ghana. *Journal of Business and Enterprise Development.*

Quartey, P., Udry, C., Al-hassan, S. and Seshie, H. (2012). Agricultural Financing and Credit Constraints: The Role of Middlemen in Marketing and Credit Outcomes in Ghana. Institute of Statistical, Social and Economic Research, University of Ghana.

Quaye, W., Ivy, Y., Tawiah, M. J. and Joseph, G. (2010). Building the capacity of farmer based organization for sustainable rice farming in Northern Ghana. *Journal of agricultural science.*

Salvatore, D. and Diulo, E. (2003). Principles of Economics, (2nd ed.): Shaum's Outline Series, McGraw Hill, New York,

Seidu, A. (2008). Technical Efficiency of Rice Farmers in Northern Ghana. The African Economic Research Consortium, AERC Research Paper 178

Steel, W. F. and Andah, D. O. (2003) Rural and Micro Finance Regulation in Ghana: Implications for Development and Performance of the industry; Africa Region Working Paper Series No. 49; World Bank.

Togba, E. L. (2009). Microfinance, Social Capital and Households Access to Credit:

Evidence From Cote D'ivoire. A paper presented at the 7th international conference on **"**Inclusive Growth, Innovation and Technological Change: education, social capital and sustainable development", organized by GLOBELICS, 6-8 October 2009, Dakar (Senegal).

Yahuala, S. (2008). Determinants of Smallholder Farmers Access to Formal Credit: A Case of MetemaWoreda, North Gondor, Etiopia. A Thesis Submitted to the Agricultural Department of Rural Development and Agricultural Extension. School of Graduate Studies, Haramaya University.

Zapata, N. R. (2006). Credit Decision And Rationing Rules: A Study of Informal Lenders in the Philippines. *Philippine Management Review*, *13*, 117-126.

Zeller, M. (1994). Determinants of Credits Rationing: A study of informal lenders and formal credit groups in Madagascar. Food Consumption and Nutrition Division, International Food Policy Research Institute, Washington, D.C. U.S.A. *World Development*, *22*, (12) 1895-1907.

APPENDIX

Sample of Questionnaire

Consent Form

Title of the Study: Formal and informal credit demand by rice farmers in the northern region of Ghana.

My name is **Miss Munira Muhammed Alhassan**. I am an M.Phil Economics student at the Department of Economics, University of Ghana, Legon.

I am collecting data for a research study to see what factors affect the demand for formal and informal credit by rice farmers in the Northern region of Ghana. You have been chosen randomly as one of the participants for this study in the northern region. We expect that the results from this survey will help the Ghanaian government to develop policies and procedures that improve the access to and demand for credit by rice farmers. Because your demand for credit is likely to be influenced by many factors if you agree to participate in this study we will ask you many detailed questions about such things as who lives in your household, your education, your children and others in the household, employment and sources of income, information on your sources of credit, information on rice farming activities and the problems you encounter in demanding credit.

If you choose to take the survey, you are free to refuse to answer any of the questions that may make you uncomfortable and you also have the option to end the interview at anytime. You can stop me at anytime to clarify the questions or ask me to repeat something if you don't understand. The question sessions will last for about one hour at a place of your comfort, privacy and convenience. We realize that your time is valuable and that it may not be easy for you to devote this much time to our survey. We would like you to know that your participation is greatly appreciated and is extremely valuable to the success of government to develop better policies and procedures to improve the credit access as well as demand by rice farmers in the Northern region. Your participation in this study will not affect you in any way as the study is solely for research purposes. Your name and any other identifying information will be accessible only to the researcher and will never appear in any sort of report that might be published. Your decision to participate or not participate will not affect you.

If you think I have answered all your doubts and questions about this study and have received a satisfactory answer, please sign or make a thumb imprint if you **consent** to participate in the study. Your participation in this study is completely voluntary. We are very grateful if you participate. Do you agree to participate in the study?

Yes_____

No _____

Signature (thumbprint if respondent is not a literate) _____ Date: _____

Signature of the Enumerator: _____ Date: _____

UNIIVERSITY OF GHANA, LEGON

DEPARTMENT OF ECONOMICS

QUESTIONNAIRE

This research questionnaire is to assist in the study on THE FORMAL AND INFORMAL CREDIT DEMAND BY RICE FARMERS IN THE NORTHERN REGION OF GHANA. This research forms part of the requirement for the award of M.Phil in Economics, a program the researcher is currently pursuing at the University of Ghana, Legon. The finding of this research is solely for academic purpose; respondents are therefore assured of confidentiality regarding any information given in this questionnaire. Your opinion is therefore needed for academic purpose only and will be treated confidential.

1. Interviewer's name…… 2. Questionnaire number ……...
3. Interview start time …… 4. District ……..……..
4. Date of Interview ……/……/……. 6. Community ……

HOUSEHOLD ROSTER

Note

1. Person to be interviewed is the rice farmer.
2. The name of the rice farmer is to be written down first, followed by men, women, male children and female children in the farmer's household.
3. Only first names of persons in the rice farmer's household should be written.
4. A household member is a person who has lived in the household for at least 6 months and eats the food prepared for consumption by household members.

SECTION A: HOUSEHOLD ROSTER –CONTINUED

For each person listed

1	2	3	4	5	6	7
ID	Who are members Of your household (List names)	Sex 1. Male 2. Female	Age in years	What is the present marital status of the person? 1. Married (Monogamy) 2. Married (Polygamy) 3. Consensual union 4. Separated 5. Divorced 6. Widowed 7. Never married	What was the main work status of the person during the past twelve months? 1.Not working 2.Employer 3.Self employed 4.Unpaid family worker 5.Househelp 6.Apprentice/ Student 7. Pensioner 8.Others (Specify)	Can the person read and write in English language? 1.Yes 2. No
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						

SECTION A: HOUSEHOLD ROSTER –CONTINUED

10	8	9	10	11
I D	Has this person ever attended school? 1.Yes 2. No	If yes to column 8 what is the highest grade successfully completed? 0.None 14.M1 1. Pre-school 15. M 2 2. Primary 1 16. M 3 3. Primary 2 17. M 4 4. Primary 3 18. S1 5. Primary 4 19. S2 6. Primary 5 20. S3 7. Primary 6 21. S4 8. JHS 1 22. S5 9. JHS 2 23. Teacher training 10. JSH 3 24. Nursing 11. SHS 1 25. Polytechnic 12. SHS 2 26. University (degree) 13. SHS 3 27. Other (Specify)	What is the religion of the person? 1. Muslim 2. Christian 3. Traditionalist 4. Others (Specify)	Is this person a household head? 1.Yes 2. No
01				
02				
03				
04				
05				
06				

07				
08				
09				
10				
11				
12				
13				
14				
15				

SECTION B: Basic information about farmer and farm activities

1. Are you a member of a social organization?
   a. 01= Yes [ ] 02= No [ ]
   b. If yes specify the organization……
   c. Does this organization facilitate your access to credit?
      01= Yes [ ] 02= No [ ]
2. Did you have contact with any extension agent during the 2011/2012 production year?
   a. 01= Yes [ ] 02= No [ ]
   b. If yes how many times? .....

3. Is rice farming your major occupation? 01=Yes [ ] 02=No [ ]
4. If No to question 3 what other economic activity are you engaged in? 01= Trading [ ] 02=Salary worker [ ] 03= Artisan [ ] 04=other farming activities [ ] 05= Others [ ] specify……

5. During the 2011/2012 cropping season how many people did you employ for the following **rice farming** activities?
Note: A=Adult (More than 18years) and C=children (Less than 18years)

FARM ACTIVITY	Family labour										Hired labour									
	Male					Female					Male					Female				
	Quantity		Number of days		Wage/day	Quantity		Number of days		Wage/day	Quantity		Number of days		Wage/day	Quantity		Number of days		Wage/day
	A	C	A	C		A	C	A	C		A	C	A	C		A	C	A	C	
Weeding																				
Bed Preparation																				
Planting																				
Insect control																				
Fertilizer application																				
Weed control																				
Harvesting																				
Threshing																				
Transportation																				
Others (Specify)																				

What was the value of your farm income for the year 2011/2012 production year?

a. Income from food crops produced

1	2	3		3	4
List of Crops	Did you produce any of the following crops? 1.Yes 2. No	If yes to column 2 how much did you produce?		If yes to column 2 did you sell some/all the crops? 1. Yes 2. No	If yes how much revenue did you receive in GH₵?
		Quantity	Unit of measurements		
Rice					
Maize					
Groundnuts					
Millet					
Sorghum					
Soybeans					
Cowpea					
Yam					
Cassava					
Others					

b. Income from animals kept by farmer

1	2	3	4	5
Animals	Did you keep any of the following animals? 1.Yes 2. No	If yes to column 2 did you sell some/all the animals in the last 12months? 1. Yes 2. No	If yes to column 3 how much revenue did you receive in GH₵?	What is the current value of these animals kept if you sold all in GH₵?
Cattle				
Sheep				
Pigs				
Goats				
Fowls				
Guinea fowls				
Ducks				
Donkeys				
Horse				
Rabbits				
Others				

6. What is the total value of your assets in GH₵?

   a. Durable goods

Asset	Do you own any of these assets? 1. Yes 2. No	If yes to column 2 how many?	If you were to sell it today how much will you receive in GH₵?
Room furniture			
Sewing machine			
Stove			
Refrigerator			
Deep freezer			
Air conditioner			
Fan			
Radio			
Record player			
Video player			
Desktop computer			
Laptop computer			
Printer			
Computer accessories			
Video camera			
Iron			
Bicycle			
Car			
Truck			
Cell (Mobile phone)			

Telephone (Fixed line)			
Television			
Parabolic satellite			
Blenders			
VCD/DVD Player			
Washing machine/driers			
Lanterns/Gas lights			
Water tank			
Motor-driven lawn mower			
Electric power generator			
Musical instruments			

Durable goods continued

Houses			
Cooking Utensils			
Torches			
Land (Non-farm)			
Jewelry			
Uncut Cloth			
Motorbike			
Others			

b. Farm tools

Assets	Do you own any of the following? 1. Yes 2. No	If yes how many?	If you were to sell it today how much will you receive in GH₵?
Tractors			
Hoe			
Axe			
Rake			
Shovel			
Pick (axe)			
Sickle/Reaping hock			
Harrower			
Tiller			
Water pump			
Irrigation pipe			
Cutlass			
Spraying machine			
Canoe			
Plough			
Combine harvesters			
Traller/Cart			

7. How many plots of land did you cultivate for the 2011/2012 cropping year? .....

8. How many of these plots of land did you cultivate for rice in 2011/2012 cropping year? .....

9. Please fill the table below (Only for rice farm plots)

1	2	3	4	5		6		7	8	9
Plot	Do you own this plot? 1.Yes 2. No	If No to column 2 do you pay rent? 1. Yes 2. No	If yes to column 3 how much did you pay as rent during the 2011/212 crop year?	What is the quantity of rice produced on this plot?		What is the quantity of bags sold?		What is the size of the plot?	In what unit is the size measured? 1.Acre 2.Hectors 3.Pole 4.Others (Specify)	Is this plot irrigation? 1.Yes 2. No
				Qty	Unit	Qty	Unit			
Plot 1										
Plot 2										
Plot 3										
Plot 4										
Others (specify)										

SECTION C: Information on demand for credit

1. Have you borrowed credit during the 2011/2012 production year? 01=Yes [ ] 02=No [ ]
2. If yes to question 1 for what purpose was credit contracted? 01=Rice farming [ ] 02= School fees [ ] 03=Social activities (Funerals, Naming ceremonies and Marriage) [ ] 04= Health [ ] 05= Other farming activities [ ] 06= Others [ ] specify……
3. If you borrowed for rice farming, then please answer the following questions in the tables below

a. **Formal bank credit**

1	2	3	4	5	6	7	8	9
What is the source of credit	What was the original amount borrowed GH₵	Interest charged GH₵	Was Collateral required? 1.Yes 2. No	If yes to column 4 what was the collateral required?	How long were you required to pay back (In months)?	Have you paid back the loan? 1.Yes 2. No	If no to column 7 how much is left to be paid?	What is the distance from your house to the credit source (In km)?
Ghana Commercial bank								
Agricultural development bank								
National Investment bank								
Rural bank								
Ecobank								
Stanbic bank								
Social Security Bank								
Zenith bank								
Fidelity bank								
Others (Specify)								

b. **Informal and semi- formal credit**

1	2	3	4	5	6	7	8	9
What is the source of credit	What was the original amount borrowed GH₵	Interest charged GH₵	Was Collateral required? 1.Yes 2. No	If yes to column 4 what was the collateral required?	How long were you required to pay back (In months)?	Have you paid back the loan? 1.Yes 2. No	If no to column 7 how much is left to be paid?	What is the distance from your house to the credit source (In km)?
Loan companies								
Co-operatives								
Friends and relatives								
Money lenders								
Rotating savings and credit shemes								
SUSU Collector								
NGO_S (Specialized MFI_S) support								
Government support								
Credit unions								
Others (Specify)								

Use the information below to answer the tables above

a. Codes for column five (5) 01= House 02= Car 03=Motorbike 04=Land 05= Guarantor 06=Others (Specify)

4. If no to question 1 have you ever borrowed? 01= Yes [ ] 02= No [ ]
5. If yes to question 4 where did you borrow? 01= Bank [ ] 02=Friends and relatives [ ] 03= Money lenders [ ] 04= SUSU [ ] 05=Savings and loans [ ] 06= Credit unions [ ] 07= Others [ ] specify…….
6. If yes to question 4 for what purpose did you borrowed? 01=Rice farming [ ] 02= School fees [ ] 03=Social activities (Funerals, Naming ceremonies and Marriage) [ ] 04= Health [ ] 05= Other farming activities [ ] 06= Others [ ] specify……
7. If for rice farming why didn't you borrow for your rice farming during the 2011/012 production year? 01= Never had a need for loan [ ] 02= Application was rejected [ ] 03=Did not apply because did not have collateral [ ] 04= Interest rates was too high [ ] 05= Had not repay previous loan [ ] 06=Others [ ] specify…….
8. If no to question 4 why have you never borrowed for your rice farming? 01= Never had a need for loan [ ] 02= Application was rejected [ ] 03=Did not apply because did not have collateral [ ] 04= Not aware of any credit institution [ ] 05=High interest rates [ ] 06=Others [ ] specify……

9. Do you save with any of the following? 01= Banking institution [ ] 02= Susu [ ] 03= ROSCA [ ] 04= Credit unions [ ] 05= NGO [ ] 06= Cash deposit with friends [ ] 07= Cash deposit with relatives [ ] 08=Savings and loans institutions [ ] 09=Cash savings at home [ ] 10=Others [ ] specify……..
10. If banking which bank?

    i.....

    ii……

    iii……