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**THE DETERMINANTS OF SMALLHOLDER FARMERS' ACCESS TO FORMAL
CREDIT**

EVIDENCE FROM UGANDA AGRICULTURAL CENSUS DATA 2008/2009

A dissertation presented to

FACULTY OF BUSINESS ADMINISTRATION AND MANAGEMENT

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DEDICATION

I dedicate this dissertation to my dear mother Mrs. Joyce Nancy Aciro Munduga for her tireless effort in educating, guiding, supporting and encouraging me, to my beloved husband Gerald Odongo Leslie and son Mario Mungumio Macbeth.

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LIST OF ABBREVIATIONS

GDP	:	Gross Domestic Product
MAAIF	:	Ministry of Agriculture Animal Industry and Fisheries
MFIs	:	Microfinance Institutions
NAADS	:	National Agricultural Advisory Services
NGOs	:	Non-Governmental Organizations
PLs & IF	:	Private Large Scale and Institutional Farms
RSCA	:	Rotating Savings and Credit Association
SACCO	:	Saving and Credit Cooperation
SAPs	:	Structural Adjustment Programs
UBOS	:	Uganda Bureau of Statistics
UCA	:	Uganda Census of Agriculture
UPE	:	Universal Primary Education
USE	:	Universal Secondary Education
UTE	:	Universal Tertiary Education

ABSTRACT

The broad objective of the study was to examine the determinants of smallholder farmer's access to formal financial services in Uganda with specific reference to social demographic, economic and institutional factors.

Secondary data from Uganda Agriculture Census 2008/2009 conducted by Uganda Bureau of Statistics in the 80 districts of Uganda as of July 2007 was used answer objectives of the study. This data was subject to univariate, bivariate and multivariate analysis to establish the social demographic, economic and institutional factors influencing access to formal financial services credit by smallholder farmers. At multivariate analysis, logit regression model was used to examine the determinants of smallholder farmers access to credit. From the logit model, empirical results from the regression indicates that social demographic factors of education and age of household head were significant (p-value=0.000 and 0.032) respectively but education level was more significant because its odds ratios were greater than one (primary=1.183, secondary=1.267 and postsecondary1.463) compared to farmers aged more than 44 years with odds ratio=0.942. Farmers with farm size >2 hectares was a more significant economic factor in accessing credit (odds ratio=1.119, p-value=0.000) compared to farmers who did not own livestock (odds ratio=0.923, p-value=0.001). Among the institutional factors hypothesized, farmers who accessed extension services had odds ratio 2.556 and p-value= 0.000 while a member of farmer group had odds ratio of 1.412 and p-value= 0.000) thus smallholder farmers who accessed extension services had more chances to access credit as seen by the odds ratio.

The study therefore recommends the need for policy support for improved credit access, empowerment and involvement of the youth, more innovative ways of utilizing the small pieces of land and where possible seek the leasing option, promotion and support of UPE, USE and UTE government education programs, the need to decentralize extension services from sub-county to village level, encourage farmers to form and join farmers groups and own livestock to improve their chances of accessing credit. Credit policy on rural micro-finance lending needs to be formulated in order to mobilize savings and maximize the available credit to the farming population in rural areas of Uganda.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter presents the background to the study, statement of the problem, study objectives, research hypothesis, conceptual framework, scope of study, justification of the study, significance of the study, limitation of the study, organization of study and definition of terms.

1.2 Background to the study

Smallholder agriculture is likely to remain the major engine for rural growth and livelihood improvement for some time in most of sub-Saharan Africa (Dorward et al., 1998). Uganda is a small, low-income country with a total population of approximately 30million, up to 87 percent of the population still residing in rural areas (UBOS, 2010). In Uganda, agricultural sector is the major employer and a source of livelihood for over three quarters of the population. The sector employs at least 70 per cent of all Ugandans in the labour force. According to the 2002 population census, subsistence farmers comprise of 68% of all homesteads. There is a strong belief from the government that if all 40 million hectares of arable land in Uganda is put to their full potential, every Ugandan will be richer. No wonder, the importance of agriculture to poverty reduction in developing countries has been widely documented in the literature. For instance, a strong association between high agricultural productivity and poverty reduction is reported by Datt and Ravallion (1998), and Minten and Barrett (2008). High agricultural productivity might benefit the rural poor directly, either by increasing production or generating more employment

opportunities, or indirectly, by boosting relative wages or reducing food prices (Datt and Ravallion 1998). Furthermore, indirect benefits might also accrue to urban poor who spend a large share of their income on food (de Janvry and Sadoulet 2000).

In Uganda, in spite of huge agricultural potential, the growth in agricultural production has not been able to keep pace with the growth in population. The sector has performed better, recording annual growth of 3.0%, but still this recent better performance is still below 3.2% annual population growth. Agricultural productivity is very low limiting farmers from enjoying the benefits associated with high productivity such as higher incomes and employment opportunities. According to Benin et al, (2007), the growth and performance of the agriculture sector has been dismal contributing to unemployment, underemployment and poverty. For example, evidence show that farmer's yield for a majority of crops has been stagnant or decreasing and any output gains are attributed primarily to the expansion of cultivated land (Betz, 2009; Salami *et al*, 2010). The poor performance of agricultural sector in terms of productivity and growth constitutes a major challenge and undermines welfare improvements in the farm sector and the rest of the economy.

Agricultural growth is the primary source of poverty reduction in agriculture-based economies like Uganda. The expansion of smallholder farming can lead to a faster rate of poverty alleviation; by raising the incomes of rural cultivators and reducing food expenditure, and thus reducing income inequality (Salami et al, 2010). As observed by Ravallion (2001), a rise in average household income by 2 percent leads to a fall in the poverty rates by about 4 percent on average. The 2008 World Development Report also observed that GDP growth originating in

agriculture is about four times more effective in reducing poverty than GDP growth of other sectors (World Bank, 2008).

Smallholder agriculture in many African countries studied has been facing numerous constraints. For instance, it is argued that the farm population is unable to fully utilize the opportunities from the agricultural potential because of binding constraints. One of the constraints limiting government efforts to increase agricultural production and reduce mass poverty and inequality has been lack of access to financial services in addition to other long-standing constraints to smallholder agriculture such as poor access to input and output markets, Land Tenure, Access Rights and Land Management (Salami et al, 2010). Therefore, improving smallholder farmer's access to agricultural services in Sub Saharan Africa is a central challenge facing governments in the region (Stringfellow et al, 1997).

Credit inaccessibility problem in many developing countries begun during the structural adjustment programmes (SAPs). Many governments including Uganda have been committed to market-based agricultural development which has reduced the direct role of the state in providing services. In most countries publicly financed marketing boards have disappeared and access to unsecured and subsidised credit through government lending institutions is no longer available. There is no bank which caters for the specific credit and saving needs of small- scale producers. The available piecemeal credit services are operated by small credit schemes, which are limited in scope and have specific target groups. Although, private systems are emerging but there remains a question mark about their ability to fill adequately the gap left by state withdrawal, especially in the short-term (Stringfellow et al, 1997). The inadequacy in financing and credit arrangements in these countries impede development of agriculture and rural sectors. Given that

these sectors are the mainstay of a large segment of the populace, their poor performance makes the fight against poverty even more challenging.

In Uganda, from 1998 up to date, microfinance systems have become an important component of the service sector, thanks to increased donor funding, a shared stakeholder views, government support through SACCOs development and use of skilled man power. The government of Uganda has been very instrumental in promoting financial services providers. Several microfinance institutions (MFIs) have been established and have been operating towards resolving the credit access problem of the poor particularly those who engage in small business alongside commercial banks. The informal systems commonly operating alongside the formal sector are, Rotating Savings and Credit Associations (RSCA). Saving and Credit Cooperation (SACCOs), Quick Money lenders and money keepers, NGO type MFIs, community based organizations, informal self-help groups/Associations and other traditional systems. However, it should be noted that whereas micro-finance institutions have taken financial services to millions of previously un-bankable clients due to innovative instruments, they have so far largely failed to reach poorer rural areas and/or smallholder agricultural producers whose livelihoods are characterized by highly seasonal investments, risks, and returns (Salami et al, 2010). This implies that, as it is the case in many African countries, the majority of smallholders in Uganda are left out of the rural financial system and therefore, it is imperative to understand the determinants of smallholder farmer's access to formal credit.

1.3 Statement of the problem

Credit provision is one of the principal components of rural development which helps to attain rapid and sustainable growth of agriculture. Rural credit is a temporary substitute for personal savings, which catalyzes the process of agricultural production and productivity (Yehuala, 2008). To boost agricultural production and productivity farmers have to use improved agricultural technologies, however the adoption of modern technologies is relatively expensive and small holder farmers cannot afford to self-finance. As a result, the utilization of agricultural technologies and extension has remained very low in Uganda (Sebaggala and Okello, 2009). It is argued that enhanced provision of rural credit would accelerate agricultural production and productivity (Briquette, 1999).

In Uganda, although the financial sector has tremendously expanded since 1990, access to formal financial services remains low and remains a huge challenge facing policy makers (Kasirye, 2007). There are economically active poor people who have not accessed financial services. Farmer's access to finance to buy agricultural inputs and labor wages requires liquid cash that often is not readily available with the smallholder farmers. Therefore, it is essential to expand the status of rural credit at large to improve agricultural productivity. The key question to policy makers and researchers is why the growth in financial sector has not translated into people's access and demand for financial services in Uganda particularly for small holder farmers.

Whereas a number of empirical studies have investigated the determinants of households' demand for the financial services and the factors influencing access to formal credit on the general population in Uganda and elsewhere (Yehuala, 2008, Jonhson & Nino-Zarazua, 2009;

Kasirye, 2007), evidence on smallholder farmer's access to credit in Uganda is lacking. This study, using Uganda Agriculture Census data 2008/09, will therefore attempt to examine the determinants of access to formal credit by smallholder farmers.

1.4 Objectives of the study

1.4.1 Main objective of the study

The main objective of this study was to examine the determinants of smallholder farmer's access to formal financial services in Uganda.

1.4.2 Specific objectives of study

- (i) To assess the extent to which age influences smallholder farmer's access to credit.
- (ii) To examine the extent to which gender influences smallholder farmer's access to credit.
- (iii) To determine the relationship between education level and smallholder farmer's access to credit.
- (iv) To find out the extent to which asset ownership influences smallholder farmer's access to credit.
- (v) To assess the extent to which farm size influences smallholder farmer's access to credit.
- (vi) To examine the extent to which belonging to farmer group influences smallholder farmers access to credit.
- (vii) To establish the relationship between market participation and smallholder farmer's access to credit.
- (viii) To determine the relationship between agricultural extension services and smallholder

farmer's access to credit.

1.5 Research Hypothesis

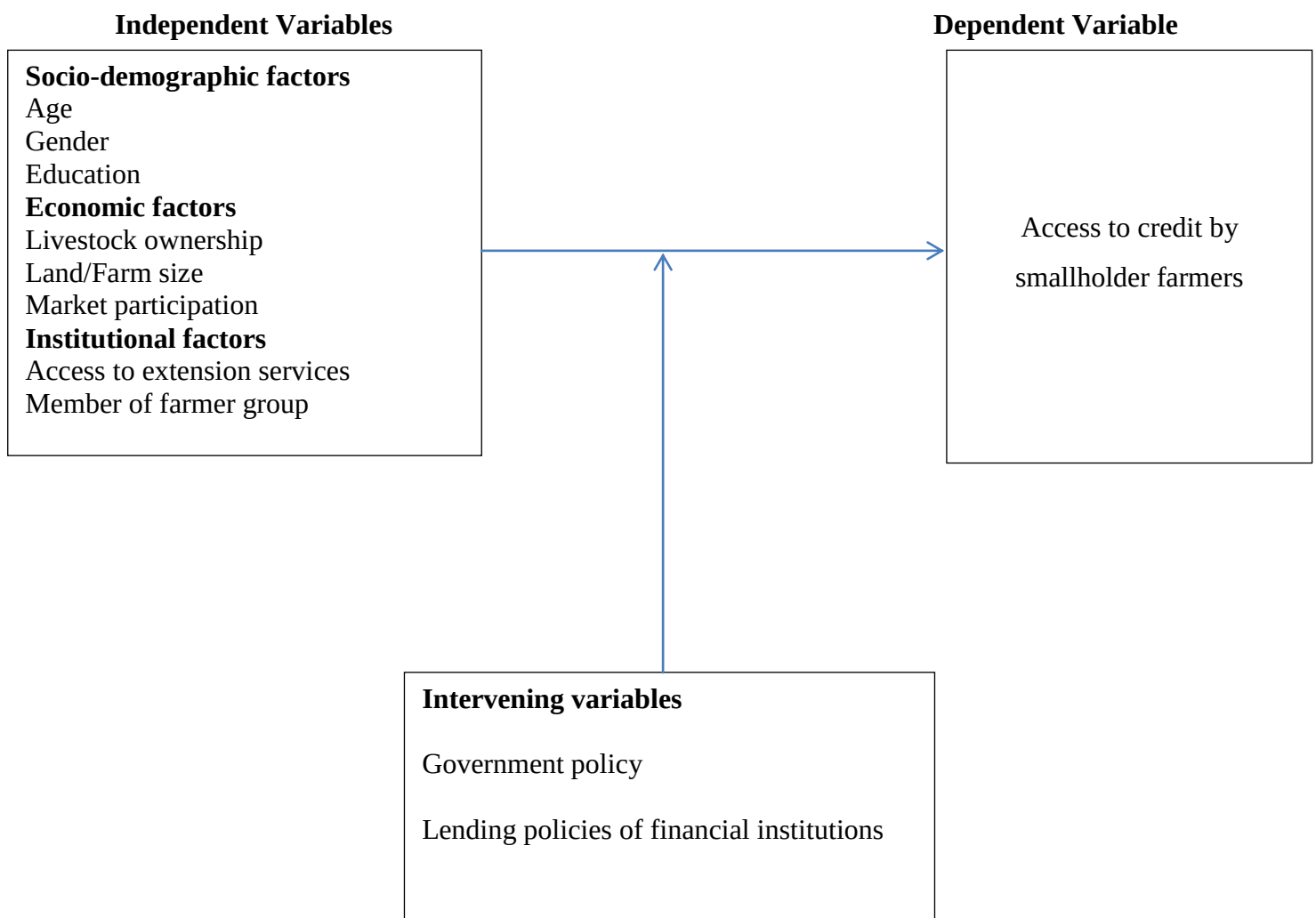
- (i) There is no significant relationship between age and smallholder farmer's access to credit
- (ii) Gender has no significant effect on smallholder farmer's access to credit
- (iii) There is no significant relationship between education and smallholder farmer's access to credit significant
- (iv) Asset ownership has no significant relationship with smallholder farmer's access to credit
- (v) There is no significant relationship between farm size and smallholder farmer's access to credit
- (vi) The relationship between farmer group membership and smallholder farmer's access to credit is insignificant.
- (vii) There is no significant relationship between market participation and smallholder farmer's access to credit
- (viii) There is no significant relationship between access to agricultural extension services and smallholder farmer's access to credit

1.6 Conceptual framework

The conceptual frame work is comprised of age, gender, education level, livestock ownership, farm size, member of farmer group, access to extension services and market participation as independent variables and access to formal credit by small holder farmers as the dependent variable. However, the framework shows that the influences of the hypothesized factors on access to credit by smallholder farmers may be dependent on other factors beyond the scope of

this study. For instance, government policy particularly credit distribution in different parts of the country, the lending policies of formal financial institutions such as collateral requirements, interest rates, loan sizes and periods; and regulatory framework of central bank that directly impact interest lending of financial institutions and liquidity that may indirectly determine access to credit by smallholder farmers. Therefore, the following conceptual framework in figure 1 below guided the researcher.

Figure 1: Conceptual framework on determinants of access to credit



1.7 Scope of the study

1.7.1 Content scope

The content scope of the study was to examine determinants of smallholder farmer's access to formal credit which comprises of age of household head, level of education of the farmer, sex, asset ownership by the smallholder farmer, farm size, being a member of a farmer group, level of market participation and access to agricultural services.

1.7.2 Geographic and time scope

The study uses nationally representative census survey data on agriculture collected by Uganda Bureau of Statistics. The Uganda Census of Agriculture (UCA) 2008/09 was conducted as a joint effort between the Government of Uganda as the funding agency and the Uganda Bureau of Statistics (UBOS), in close collaboration with the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) as the implementing agencies. The UCA 2008/09 covered all the 80 districts in the country as of 1st July 2007.

1.8 Justification of the study

Credit is an important instrument for improving the welfare of the poor (Okurut et al., 2004). Inadequate availability of formal credit to support production activities of majority of the resource poor farm households, who constitute the bulk of agricultural producers in rural Uganda, has constrained agricultural growth and development. Therefore, understanding access to formal credit of the different groups of households is important for policy purposes for at least two reasons. First, it can serve as guide for the allocation of scarce resources to the numerous

development programs competing for the same funds. Secondly, it establishes the relative importance of the various factors that permit certain households in a given socioeconomic environment to achieve greater benefits from access to formal credit than others (Zeller and Sharma 1998). This study takes an important step in quantifying the extent and determinants of households' access to formal credit markets.

1.9 Significance of the study

Significance of the study is twofold. The study will enable the researcher make recommendations to government, the private sector (financial institutions) and agriculture policy makers on what policies, strategies and effective interventions to employ to improve access to formal credit by smallholder farmers.

Secondly since little research has been done on determinants of credit by smallholder farmers in Uganda, minimal information exists in this regard. The study will therefore be a source of reference to other researchers intending to do further research in this field.

The study will help farmers appreciate the benefits that accrue to them by joining farmer groups and seeking agriculture extension services that exposes them to information on opportunities that would benefit them.

It will help NGOs in the agriculture sector understand the factors that hinder smallholder farmers from accessing credit that would have improved on the quality and quantity of their yields hence their improved livelihoods.

1.10 Limitations of the study

Due to the fact that most households do not keep records, the accuracy of most of the data collected is depended on individual's ability to recall. However, it is believed that the data obtained provide a useful basis of information for making recommendations to improve access to credit by the majority smallholder rural poor farmers.

Data had a lot missing values for number of variables in the study. This problem was addressed by replacing the missing values by neighboring non-missing values. This approach is considered appropriate particularly when observations occur in some definite order. Typically, this occurs when values of some variable should be identical within blocks of observations. The assumption made in this study was that farmers within the same villages have similar attributes on a number of factors with little or no variability. Therefore, data was sorted by village from which missing observations were replaced by neighboring non-missing value.

1.11 Definition of key terms

(i) Smallholder farmers

For purposes of this study, “smallholder farmers” shall refer to farming households with land holdings of less than ten hectares.

(ii) Access to credit by smallholder farmers

A farmer accesses credit if he or she received loan in the last five years meant to be used on agriculture activity.

1.12 Organization of the study

This research dissertation was organized into five chapters. Chapter one constituted the introduction, which focuses mainly on the background, statement of the problem, objectives, research hypothesis, the scope, conceptual framework, justification and significance of the study, study limitations and definition of key terms. Review of the theoretical and empirical literature pertinent to the concern of the dissertation is presented in Chapter two. Chapter three describes the research methodology that includes a brief description of the data used including the design used, scope, sampling procedures, analytical techniques and data analysis. Chapter four, reports the results of the study along with discussion of findings. Finally, summary of the major findings, conclusion and recommendation are presented in Chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the review of literature. The first section of literature presents the access to credit by farmers; section two reviews literature on determinants of access to formal credit. This was undertaken so as to provide the study with various determinants of access to formal credit.

2.2 Access to credit by smallholder farmers

According to the free on line dictionary, Encyclopedia (undated), credit means Faith and it comes from the Latin credit. An agreement, by which something of value-goods, services, or money-is given in exchange for a promise to pay at a later date. Credit is a transaction between two parties in which one, acting as creditor or lender, supplies the other, the debtor or borrower, with money, goods, services, or securities in return for the promise of future payment. As a financial transaction, credit is the purchase of the present use of money with the promise to pay in the future according to a pre-arranged schedule and at a specified cost defined by the interest rate (Yehuala, 2008).

Others have defined credit as a sum of money in favor of the person to whom control over it is transferred, and who undertakes to pay it back (Ellis (1992). Beckman and Forster (1969) however, defined credit as the power or ability to obtain goods or services in exchange for a promise to pay later.

Access to credit is a crucial factor in the development of the agricultural sector. Agricultural producers rely on credit facilities to raise the capital required to initiate and sustain productive endeavours. However, evidence shows that smallholder farmers in East Africa including Uganda depend on savings from their low incomes, which limits opportunities for expansion. For example, a survey of a sample of 344 rural households in Tanzania between May and August 2001 showed that half of total rural household income came from farming, 46.6 per cent from nonfarm employment (wages and self-employment) and less than 4 percent from remittances (Salami et al, 2010). Because of the lack of collateral and/or credit history, most farmers are bypassed not only by commercial and national development banks, but also by formal micro-credit institutions. In addition to their own sources, farmers thus rely on incomes of friends and relatives, remittances, and informal money lenders.

In deed the share of commercial banks' loans to agriculture has been very low compared to manufacturing, trade, and other services sectors, hampering expansion and technology adoption in East African countries. For example, in Kenya, the lack of capital and access to affordable credit is cited by smallholders as the main factor behind the low productivity in agriculture. Access to formal credit in Tanzania and Ethiopia is mainly confined to large urban centers, where collateral requirements are high. In Uganda, high interest rates inhibit agricultural investments. While more recently micro-finance institutions have taken financial services to millions of previously un-bankable clients due to innovative instruments, they have so far largely failed to reach poorer rural areas and/or smallholder agricultural producers whose livelihoods are characterized by highly seasonal investments, risks, and returns (Peacock *et. al.*, 2004).

According to Oluka (2007), only 38 percent of Ugandans save, and borrow money from financial institutions. The study showed that only about two-thirds of Ugandans do not have access to financial services of any kind, making them - along with Tanzanians - the most financially "unserved" people in the east Africa. It is then believed that this could be a major impediment to utilization as Ugandans know the value of saving, with 79 per cent agreeing to the statement, "saving can alleviate poverty," while 64 per cent agreed to "try to avoid taking loans as much as possible." there is need to explore more on this.

According to the National Survey (2006) on Access to Financial Services in Uganda, only 38 per cent of Ugandans had access to financial services unlike Kenya, where 62 per cent of the population have access to financial services. According to the survey, of the 8.1 million Ugandans with access to financial services, 18 per cent had access to formal financial institutions like commercial banks, microfinance institutions or credit institutions; three per cent are served by semi-formal institutions like savings and credit co-operative societies, while 17 per cent go to informal groups.

Only 18% (2.4m) of the Ugandan adult population use any type of formal financial service (tier 1-3 in the diagram overleaf), while another 3% (0.4m) use semi-formal financial services (tier 4 below). 17% (2.2m) use informal financial services only, while 62% (8.2m) do not use any type of financial service (Fin scope Uganda, 2006.) These statistics suggest that the population is not actively engaged by the formal financial sector. Agricultural finance is almost non-existent, and rural outreach of financial services is weak. Only a small proportion of the population has access to formal financial services. The majority of the poor have no savings accounts, neither do they have access to loans from formal financial institutions and have no insurance policies. Instead,

many rely on informal services – ranging from the most traditional (e.g. saving in boxes at home) to a cooperative system.

Steadman group (2007) carried out a similar survey in Tanzania, and found that only nine per cent of the adult population - comprising more than 21 million people - had bank accounts, while 27 per cent had never heard of a savings account. This is not any different from the Ugandan case. And these results, according to Adrian Stone of the UK's Department for International Development (DfID), provide a plausible explanation for the current growth patterns in the East African region. He said that limited access to financial services in Uganda, for instance, has been a major "brake on economic growth." "There are people who can't take advantage of investment opportunities because they don't have access to financial services," he added.

2.3 Empirical literature on factors influencing access to credit by smallholder farmers

Evidence from a number of studies reveals that the factors that affect access to financial services are numerous. Income, wealth and education offer key roles in explaining use (Claessens 2006). Further factors of convenience and trust and the lack of need or ability to save are also important, as are overall perceptions of the formal sector which can be affected by banking crisis and wider macro-economic conditions (Claessens 2006). Convenience in terms of geographical conditions is recognized as a key issue in the literature. Beck et al (2007b) have undertaken cross-country analysis of the variation in banking sector outreach across countries. For instance, evidence from studies by Pitt and Khandker, (2002), Swain (2007) and Jabbar et al, (2002) identified that seasonal fluctuations in income, gender and education level of the household head, training, prevalence of an outstanding loan, family size, primary economic activity of the household head,

interest rate, price of output, and area of operational holdings as important determinants of access to formal credit.

In addition, Bigsten et al. (2003), and Fliesig (1995), stated that in developing countries asymmetric information, high risks, lack of collateral, lender-borrower distance, small and frequent credit transactions of rural households make real costs of borrowing vary among different sources of credit. Because sometimes the factors from supply side of the credit market such as the level of interest rates charged on loans may not seem to be important factor for small holder farmers to get loans from formal financial institutions, this study focuses on socio-demographic, economic and institutional factors that may contribute to farmer's chances of getting loan and thinks this factors are very important.

Diagne and Zeller (2001) in their study in Malawi found that formal lenders in Malawi—such as rural banks, savings and credit cooperatives, and special credit programs supported by the government and nongovernmental organizations—prefer to give loans to households with diversified asset portfolios and therefore more diversified incomes. This is presumably done to increase and stabilize repayment rates. It also found that households in Malawi are generally credit constrained in both the formal and informal sector of the credit market. For example, close to half of the households participating in formal credit programs still have binding credit constraints.

Therefore, a number of factors explain why certain individuals may access credit more than others. Factors may be related to borrower's characteristics, the loan terms and conditions imposed by lenders (Zeller, 1994). Schmidt and Kropp (1987) revealed that the type of financial

institution and its policy will often determine the access. Where credit duration, terms of payment, required security and the provisions of supplementary services do not fit the needs of the target group, potential borrowers will not apply for credit even where it exists and when they do, they will be denied access.

FDU (2006) found out that the employment, or main source of income play such a big role on the kind of financial services used and overall inclusion. It was found out that being a formal sector employee (government or private sector) was one of the strongest influences on use of formal sector services and significantly reduced likelihood of being excluded. They however agreed to the fact that main source of income is “in part related to income poverty” though not entirely. The nature of employment is linked to the fact that those working in formal sectors are more likely to receive their pay through formal sector service providers. Those whose main source of income or employment was domestic chores; dependence on pension, transfers from others or farm work, were much more excluded than those running their own business.

Ayoki and Birungi (2006) pointed out a number of existing informal financial systems which included savings and credit cooperation (SACCOs), NGO type MFIs, Money lenders and money keepers, community based organizations, informal self-help groups/Associations and other traditional systems. These all stand in the way of choice to access of formal financial systems. Take an example of money lenders who give cash instantly though at high interest rates as compared to the long process and requirements of formal institutions. Money keepers simply save their clients the hassle of formal systems (Quos, formal requirements and the like), while

they also help themselves with the little accumulated savings to raise their businesses instead of going for blowing interest rates of the formal financial institutions.

Institutional factors have also been identified as one of the factors limiting access to finance to some sections of the population particularly women and the poor rural people. For example, rural women's access to financial resources is limited by biased lending practices that emerge when financial institutions in the area consider them smaller, less experienced and therefore less attractive clients, or when institutions lack the knowledge to offer products tailored to women's preferences and constraints (Fletschner and Kenny, 2011). It is common to find financial institutions refusing to fund women and the poor because of their type of activities, when it does not accept female guarantors, when its requirements are not clear or widely known or when, as it is typically the case, loans to women are smaller than those granted to men for similar activities (Fletschner, 2009; Fletschner and Kenny, 2011).

According et al, (2009) citing Barslund and Tarp (2008) found countervailing impacts of education, number of dependants, assets, credit history, and secure land rights on the demand for formal and informal loans. These variables, however with exception for assets had a statistically significant effect on formal or informal credit demand. Connections to credit institutions have a positive significant impact on the demand for both formal and informal loans. The authors' analysis suggests that the demand for formal loans is largely driven by factors such as land holdings, and hence geared towards production purposes and asset management, while informal credit demand is negatively associated with factors such as age and education and positively associated with a bad credit history and the number of dependants, indicating a household's

tendency to use informal loans for consumption smoothing rather than investment (Bendig et al, 2009). In another study by Pal (2002) evidence results shows that more land holdings and less labor income significantly increase the probability of formal loan use.

According to Zeller and Sharma (2002) borrowing during adverse times is an integral part of the livelihood system of households in developing countries. Therefore, the fact that developing countries' economies are prone to shocks indicates that the experiencing of shocks should have an effect on the demand for loans. The results show that many borrowers in Burkina Faso do not take loans to start a new economic activity, but rather to supplement inadequate operating capital for their already running business or to restart an activity after a break which could have resulted from a shock.

2.4 Determinants of smallholder farmer's access to credit

In this section, the review of the factors that affect access to credit by farmers hypothesized in the conceptual framework.

2.4.1 Age and access to credit

Age, is usually measured in terms of the respondent's number of years of age at the time of data collection. Age is one of the most important factors suggested by theory. Young farmers and individuals are likely to have a high demand for debt because of their expectation of higher income and higher consumption in the future compared with their current low income. As their age increases, their income becomes higher which make them less likely to borrow because they have enough income to support their demand. We can expect that there is a certain age threshold

beyond which the desired debt will stop growing and start falling. In other words, the relationship between the probability of borrowing and age is expected to have an inverted U shape. The lenders, however, are likely to favor older borrowers as their ability to pay is higher. In order to capture this nonlinear relationship, we use both linear and quadratic terms of age as independent variables.

A positive relationship is presumed with regard to age of the household head. For instance, the need for loans is very likely to decrease when the household head retires. Study by Okurut et al. (2004) revealed that age is an important variable influencing access of households' heads to credit. However, as noted by Yehuala (2008), older individuals, due to life and business experiences have much better association with cooperatives and other formal credit institutions, and it is hypothesized that elderly may have more access to formal credit facilities. Mostly the age group between 25 and 44 are more likely to use formal services as compares to the young (18-24) although the now older population might have not had many chances at every early stage in life to use these services due to the political shake ups of the 1970s and 1980s. These factors however over rode the meaning of the geographical location. More is yet to be confirmed about these facts.

2.4.2 Gender and access to credit

Gender refers to biological differentiation of human being. Due to many socio-cultural values and norms males have freedom of mobility and participation in different meetings. Evidence in the literature indicates that female-headed households have less access to credit and utilization of agricultural information and improved technologies, credit, land, and extension service. Women

are frequently discriminated against in formal credit markets in developing countries (Buvinic, Sebstad and Zeidenstein, 1979). The belief in discrimination against women in formal credit markets, often based upon the limited number of women borrowers in the market, is perceived as an outcome of lenders' rejection of women's applications for loan contracts. Over a decade ago, Buvinic, Sebstad and Zeidenstein, emphasized that there are: two major factors which restrict women's access to formal credit more than men's. These are related to women's lack of control over economic resources and the nature of their economic activity".

Discrimination of women in formal financial market is also widely spoken (FAO, 1984, Otero and Downing, 1989). It is argued that women's lack of control over economic resources and the nature of their economic activities restrict their access to formal credit more than men's. Other factors pointed out as constraints for women in accessing credit are related to institutional requirements, cultural and social norms and to the type of reproductive activities that women are engaged. McKee (1989) observes that gender- based credit constraints, such as limited education, inferior legal status and unpaid reproductive responsibilities aggravate the problems for women when operating small businesses.

In another attempt to evaluate women's access to credit, Lycette and White (1989), noted that there is little direct evidence of women's limited access to credit. The authors argued that it is difficult to carefully analyze the problem because many formal financial institutions do not keep records of financial transactions by gender since women are such a small proportion of their clients. Nonetheless, based on a few case studies, the authors reported that women small-business owners, in both urban and rural areas, face problems with regard to credit that men do not experience. The perception that formal financial institutions discriminate against women

does not only focus on developing countries in Africa, Asia and Latin America. This view is also pervasive in developed countries. A large literature treats the issue of bank discrimination against female business owners in Western countries, but the measurement of discrimination is largely based on subjective perceptions and lacks statistical support. Gender difference is found to be one of the factors influencing access to and utilization of agricultural information. So it is hypothesized that male household farmers would have more access to agricultural information. The likelihood of demand/access for/to credit is assumed to be lower in female-headed households as women are often poorer than their male counterparts (Bendig *et al*, 2009).

For example, gender has been demonstrated as one of the important factors hindering women access to credit in many developing countries. Legal regulations and customary rules often restrict women's access to and control over assets that can be accepted as collateral such as land or livestock. Women are much less likely to have land titled under their name, even when their families own land, and are less likely than men to have control over land, even when they do formally own it. Biased inheritance rights often bestow land to male relatives, leaving both widows and daughters at a disadvantage (see Fletschner and Kenney, 2011).

The word "gender" could be said to be an ideology that justifies the allocation of duties on the analysis of social relation and being marked by the economic determinism with all household processes being judged in terms of what they contribute to the development processes. It has often been misunderstood as being about the promotion of women only. However, Bhattacharya and Thansi (1995) opined that gender focuses on the relationship between men and women, their roles, access to and control over resources, division of labour and needs. Boserup (1970), described gender as a set of characteristics, roles and behavioural patterns which distinguishes

women from men, which is not biologically constructed but socially and culturally. To this effect, Okorodudu (2000) opined that certain task activities are regarded as “male” or “female”, and in some settings, a rigid division of labour exists between men and women. In agricultural production, women are more constrained than their male counterparts as a result of which most women have less access to and higher effective costs for information technology, inputs and credit (Shultz, 2007). Adesina and Djato (1997) buttressed that gender inequalities reduce productivity in farm and enterprises. These lead to inefficiencies that arise from excluding women from access to productive resources, public services, and employment.

Productive resource such as agricultural credit is very vital for efficient production. Agricultural credit is needed by both male and female farmers to enable them cope with the risk and uncertainty situations of farming business (Nweke, 2001). It is the first essential factor in agricultural production and with it, farmers can secure farm inputs, equipments and hire additional labour. The socioeconomic characteristics of both male and female farmers have been noted to have significant effect on gender access to credit. Again, certain acceptable traditional and cultural norms of the society have been noted to serve as constraints to gender access to credit (Doss, 1999).

2.4.3 Education and access to credit

The level of education attained by a farmer not only increases his/her farm productivity but also enhances ability to understand and evaluate new production technologies (Eze, 2007). Possession of literacy is one of the criteria for the procurement of formal credit from micro finance banks (Njoku and Odii, 1991).

Education of the household head has also been documented as an important factor determining access to credit. For example, literature shows that fewer years of schooling has a negative relationship with the demand/access for/to formal financial services as less educated people may be less able to understand the concept behind formal financial services and the technical procedures attached to it. In addition, low education levels are often correlated to less productive jobs and lower incomes, which in turn can be expected to reduce both access to credit (because of lacking collateral). In some studies (Yehuala, 2008), it was further noticed that those educated to at least secondary level have higher chances to access to formal services, let alone the gender factor where women concentrated more on the use of informal services as compared to their male counterparts (Okurut et al, 2004).

2.4.4 Livestock ownership and access to credit

Livestock-keeping constitutes an important source of livelihood for the rural poor. Livestock owners use their animals either as a means of production (for example of meat, milk, wool, eggs) or as capital (accumulation of wealth), or both. Investments in livestock provide the following:

- Long-term security by strengthening social relations through the exchange of stock and products;
- Short-term seasonal security where the net benefits of the harvest are invested in livestock to be sold at the beginning of the following cropping cycle to finance the farm;
- Cash flow through sales of milk, wool or meat, the proceeds of which help cover various household expenses (such as schooling and health care).

2.4.5 Land and access to credit

The available land in East Africa is overly subdivided into small and uneconomic units, resulting generally in fragmented production systems and low productivity. In fact, the farm sizes range from as low as about 1ha per household in Ethiopia and 2.0 ha in Tanzania and 2.5ha in Uganda and Kenya. Despite their small sizes, the landholdings in the study countries exceed the African average of 1.6 ha, but remain well below those of North America (121 ha), Latin America (67 ha) and Europe (27 ha). In addition to this very low absolute level of landholding, the distribution of available land is highly inequitable. Specifically, households in the highest per capita land quartile in East and Southern Africa control 5 to 15 times more lands than households in the lowest quartile. In Kenya, for example, mean farm sizes for the top and bottom land quartiles were 6.69 and 0.58 hectares, respectively, including rented land (Jayne et al., 2006). The land ownership issues go well beyond small sizes of plots. For example, in Ethiopia, all land is state-owned, according to the country's 1994 constitution. In practice, traditional land tenure arrangements prevail as an outcome of subsistence agriculture, with peasant associations responsible for allocating land to residents (Kamara, *et al* 2004). According to Kebede (2002), privatization of land would seem to be the most effective way to reduce insecurity associated with the tenure schemes and uncertainties created by state ownership. Equally important, in terms of access to additional land, is proper management of the existing one. According to Kimaru and Jama (2005), in East Africa sustained gains to agricultural productivity are threatened by land degradation, especially land erosion and loss of fertility. A number of programs during the past several decades were implemented by the Swedish International Development Agency and other development partners with a view to preserve the agricultural

land in the region. The study found that clear land-use and agricultural policies need to be developed to provide a framework for researchers, extension workers and smallholder farmers on environmentally-sensitive practices. Nevertheless, the lack of clarity of property rights and unequitable access to land exacerbate the land degradation problem.

Landholding (size of owned land), a natural capital variable has been found in many studies to be a significant factor influencing access to formal credit. In some studies the relationship is negative implying that farmers with relatively small land asset have greater access to formal credit than large land owners.

2.4.6 Market participation and access to credit

Participation shall refer to any situation which involves the exchange of goods for money regardless of location. Market access plays a remarkable role in ensuring better income and welfare for smallholder farmers through diverse channels.

Improved access to input and output markets is a key precondition for the transformation of the agricultural sector from subsistence to commercial production. Smallholder farmers must be able to benefit more from efficient markets and local-level value-addition, and be more exposed to competition. East African countries are still grappling with marketing of both agricultural inputs and outputs, with markets not adequately equipped to serve the needs of the poor. According to the 2005/2006 household survey conducted in Uganda, 30 percent of communities surveyed did not have access to roads that were passable even in the dry season and two-thirds of communities lacked any bus or taxi connections. In most East African countries, more than half the population lives five hours or more from a market center. *On the input side*, the average application rates of fertilizer for arable crops in four countries are estimated to be 30 kg/ha/year in Kenya, 14

kg/ha/year in Ethiopia, 5kg/ha/year in Tanzania and 1 kg/ha/year in Uganda – far less than the world average of 100kg/ha/year (Smaling et al , 2006 and Ariga et al, 2006) . There is also the problem of high cost and waste of key inputs such as seed and fertilizers. For this reason, farmers have substantially reduced use of quality inputs such as seed, fertilizer, and pesticides. For example, in 2006, it was reported in UNDP (2007) that the respective use of improved seeds, fertilizers, agro-chemicals and manure were only 6.3 per cent, 1.0 per cent, 3.4 per cent and 6.8 per cent of the parcel of agricultural land in Uganda. Also, the 2007 Tanzania's Poverty and Human Development Report revealed that 87 percent of Tanzanian farmers were not using chemical fertilizers; 77 percent were not using improved seeds; 72 percent were not using pesticides, herbicides or insecticides (agrochemicals), as a result of high costs of agricultural inputs and services (R&AWG,2007). *On the output side*, since the majority of smallholder farmers in the four countries are in subsistence production, marketing is underdeveloped and inefficient. Adequate storage facilities constitute another constraint to both marketing and food security: In Africa, large quantities of agricultural commodities produced by farmers tend to rot away unmarketed, while the smallholder farmers do not have the technology for timely consumption (Kamara, *et al*, 2002). An additional key constraint on the output side to raising productivity of smallholder farmers in East Africa has been the inability of most of them to get linked into the supermarket chains. The main barrier is that they cannot meet the high quality and safety demands as well as delivery schedules that international value chains require, preventing them to compete in such markets.

2.4.7 Extension services, social participation and access credit

For many smallholder farmers and resource-poor farmers, the most common farmer support service that represents the main source of information on relevant improved technology and market access, is the public extension service (MALA, 1998).

Extension service provides access to other opportunities for agricultural progress through links to training, research, sources of input supplies and possible markets (Machethe, 2004 & Kirsten *et al*, 1993). For instance, in the southern region of the Philippines and Cambodia, provision of training, related to crop production and marketing through capacity building workshops, strengthened farmers' ability to market their crops in formal markets (Lapar *et al*, 2003).

Evidence from sub-Saharan African countries, such as Uganda and Namibia, shows that farmers who receive extension service appreciate it (Peacock & Jowett, 2006). However, the problem is that the coverage is low and biased towards better-off farmers (Peacock & Jowett, 2006). In South Africa and Africa as a whole, the quality of the extension service in rural areas is not satisfactory and the demand exceeds supply (van Zyl, 1998 & Kirsten *et al* 1993).

Studies on the demand for credit and savings deposits revealed that factors that increase awareness on the part of household such as household's proximity to an adequate financial institution, extension services and social groupings are crucial determining access to formal credit demand because it reduces the transaction costs that hinder household access to credit such as lack of information and availability of credit.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methods and procedures used in the study. It presents the research design, study population, sample size and design, data sources and types, data processing and ethical considerations.

3.2 Research Design

A cross-sectional design was used in this study. The study design involved collecting data on variables on determinants of access to credit (age, gender, education level, land size, access to extension services, market participation, asset ownership and member of farm group) by small holder farmers at a point in time. In this design, data collection and analysis employed both quantitative and qualitative approaches.

3.3 Study population

The study focused on determinants of credit by smallholder farmers in Uganda. The unit of analysis in this study was smallholder farmer house hold heads in Uganda hence the target population estimated at 3,787,487 (UBOS Census report, 2002)

3.4 Sample size and sampling design

3.4.1 Sample size

A sample of 88,213 was considered which according to Roscoe (1975), individual respondent sample size between 30 and 500 or more is appropriate for most multivariate research where the sample size should be several times larger than the number of variables in the study. In this case, the sample of 88,213 is 11,026 larger than the number of variables hence the justification of the sample size.

3.4.2 Sampling design

A stratified two-stage sample design was used for the small and medium-scale household-based agricultural holdings. At the first stage, Enumeration Areas (EAs) were selected with Probability Proportional to Size (PPS), and at the second stage, households which were the ultimate sampling units were selected using systematic sampling. A total of 3,787,487 out of the 5,186,558 households enumerated during the 2002 Population Housing Census reported that one or more of their members was/were engaged in an agricultural activity as of September 2002. These households were referred to as “households with agricultural activity” or “agricultural households”.

3.5 Sources of Data

The data used in this study comes from the 2008/2009 Uganda Census of Agriculture (UCA). The census was carried out by the Ugandan Bureau of Statistics (UBOS) and covered all the 80 districts in the country as of 1st July 2007. Small and Medium scale holdings constituted the

sampling frame from which a sample was drawn. Since, the contribution of production (crop and livestock) by the Private Large-Scale and Institutional Farms (PLS & IFs) has been increasing over time, the census also covered PLS & IFs on a complete enumeration basis. The UCA 2008/09 collected data on various socio-economic and institutional characteristics of the agricultural holdings such as: Number and Size of holdings, Land tenure system, demographic characteristics of the holder and his/her household, access to agricultural extension services, technological adoption, market access and credit. This data was used in this current study because it is the only national household survey data that has covered agriculture farmers in Uganda.

3.6 Data processing and analysis

3.6.1 Data processing

Data collected from Uganda Bureau of Statistics was in STATA format and constituted different modules (form 2 and form 5). The initial stage of data analysis was extracting the variables of interest as per the conceptual framework, checking them for consistency particular checking for outliers, missing values and appropriate coding. After data management and cleaning, data were scrutinized and analysis was conducted at three levels. Univariate, bivariate and multivariate analysis as explained below.

3.6.2 Univariate analysis

Frequencies, percentages and cumulative frequencies were used to describe smallholder farmer responses to the variable under consideration and also to meaningfully represent the summarized

data. In this study therefore, frequencies, percentages and cumulative percentages were used describe the variables used in the study.

3.6.3 Bivariate analysis

A chi square (X^2) statistic was used to investigate whether distributions of categorical variables differ from one another. The Chi Square statistic compared counts of categorical responses between the independent variables and the dependent variable (access to credit by smallholder farmers) and the hypothesis being tested. The study used a 2 x 2 contingency table with the independent variables; age of smallholder farmer, gender of smallholder household head, education level, assess ownership, farm size, member of farmer group, access to extension services and market participation against the dependent variable ; access to credit by smallholder farmers. The *chi-square test statistic* is computed as

$$X^2 = \sum \frac{(\text{observed} - \text{expected})^2}{\text{expected}}$$

where the square of the differences between the observed and expected values in each cell, divided by the expected value, are added across all of the cells in the table.

The distribution of the statistic X^2 is *chi-square* with $(r-1)(c-1)$ degrees of freedom, where r represents the number of rows in the two-way table and c represents the number of columns. The distribution is denoted $\chi^2_{(df)}$, where df is the number of degrees of freedom.

The chi-square distribution is defined for all positive values. The *P-value* for the chi-square test is $P(\chi^2 \geq X^2)$, the probability of observing a value at least as extreme as the test statistic for a chi-square distribution with $(r-1)(c-1)$ degrees of freedom.

Decision rule

- 1) If the chi-square p-value is less than 0.05, then there is a significant relationship among the two variables implying that we reject the null hypothesis.
- 2) If the chi-square p-value is greater than 0.05, then there is no significant relationship among the two variables implying we accept the null hypothesis.

3.6.4 Multivariate analysis

This study used a multivariate logistic regression to examine the determinants of access to credit by smallholder farmers. Pedhazur (1997) discussed the applicability of using regression analysis when the objective of the study is to better understand how a set of descriptors explains an outcome. Menard (2002) recommend using logistic regression analysis when the dependent variable is dichotomous. Logistic regressions require that the dependent variable is binary in nature. The dependent variable for this study is binary and takes a value of zero or one depending on whether or not a farmer received a credit from a formal institution. However, the independent variables are categorical.

3.6.4.1 Model Specification

The probability of access to formal credit is a discrete variable with two values. Access to formal credit is equal to one if a farmer received a loan from a formal financial services, and value of 0 if otherwise. The decision to access formal financial services situation is influenced by socio-demographic, economic and institutional factors as presented in the conceptual framework. Therefore, credit accessibility and non- accessibility reflects a binary relationship and the logistic model suggests that the probability (P) that an individual will access formal financial services can be given by:

$$\log \frac{\hat{Z}_i}{1 - \hat{Z}_i} = \log \frac{\Pr(\text{Access})}{1 - \Pr(\text{Access})} = \beta_0 + \beta_1 X_1 + \dots + \beta_j X_j + \mu_i \dots \dots \dots (1)$$

Where $X_1 \dots X_j$ represent the socio demographic, economic and institutional factors hypothesized to affect access to formal credit; and $\Pr(\text{Access})$ represents the likelihood of a farmer using a formal financial service and μ_i as the disturbance term. On the left-hand side of the regression model, the dependent variable represents the access strand which is used; hence taking a dichotomous form: a value of 1 if formal financial service is used and a value of zero otherwise. On the right-hand side of the model, are the independent variables extracted from the Uganda Census of Agriculture 2008/2009 and include age of household head, gender of household, education level of household, livestock ownership by the household, farm size (land ownership in hectares), Social Participation measured in terms of membership to farmer group (1= member, 0= nonmember), access to agricultural extension services and market participation

measured by dummy variable (1 if the farmer sold 50% and more of his/her output, 0, otherwise).

Therefore, the model that was estimated is specified below:

$$\log \hat{Z}_i = \log \frac{\Pr(\text{Access})}{1 - \Pr(\text{Access})} = \beta_0 + \beta_1 \text{age} + \beta_2 \text{gender} + \beta_3 \text{educ} + \beta_4 \text{livestock} + \beta_5 \text{farmsize} + \beta_6 \text{marketparticipation} + \beta_7 \text{Extension.} + \beta_8 \text{farmer_group} + \mu_i \dots \dots \dots (2)$$

Using the odds ratio (OR) to interpret the coefficients where odds is defined as the ratio of the probability of occurrence of an event to that of non-occurrence, the odds ratio gives the amount of change expected in the dependent variable when there is a unit change in the independent variable with all the other variables in the model held constant.

The rule of the thumb in interpreting the odds ratio (OR) is that

If the $OR > 1$ then the odds of $Y=1$ increases

If the $OR < 1$ then the odds of $Y=1$ decreases

3.6.4.2 Justification of variables

(a) Age and access to credit

A positive relationship is presumed with regard to age of the household head as hypothesized that elderly may have more access to formal credit facilities. A Study by Okurut et al. (2004) revealed that age is an important variable influencing access of households' heads to credit as noted also by Yehuala (2008), older individuals between the age group between 25 and 44 are

more likely to use formal services as compares to the young (18-24) due to life and business experiences have much better association with cooperatives and other formal credit institutions.

(b) Gender and access to credit

It is hypothesized that male household farmers would have more access to agricultural information and access to credit as compared to the female household heads. According to (Buvinic, Sebstad and Zeidenstein, 1979) “there are two major factors which restrict women’s access to formal credit more than men’s. These are related to women’s lack of control over economic resources and the nature of their economic activity”. With this background including the existing gender differences; male headed households have mobility there is more evidence in the literature indicates that female-headed households have less access to credit and utilization of agricultural information and improved technologies, credit, land, and extension service. The likelihood of demand/access for/to credit is assumed to be lower in female-headed households as women are often poorer than their male counterparts (Bendig *et al*, 2009).

(c) Education and access to credit

Education of the household head as also been documented as an important factor determining access to credit therefore a positive significant effect is anticipated between level of education and access to credit.

Farmers who can read and write are expected to have more exposure to the external environment and accumulate knowledge. They have the ability to analyze costs and benefits. The more educated the household head the more credit he will use for consumption purposes. According to Musebe et al, (1993), as the household gets more formal education, the probability of obtaining

credit increases. Therefore, it was expected that those farmers who can read and write have better credit requirement that leads to access to use formal credit sources.

Literature shows that fewer years of schooling has a negative relationship with the demand/access for/to formal financial services as less educated people may be less able to understand the concept behind formal financial services and the technical procedures attached to it. In addition, low education levels are often correlated to less productive jobs and lower incomes, which in turn can be expected to reduce both access to credit (because of lacking collateral). In some studies (Yehuala, 2008), it was further noticed that those educated to at least secondary level have higher chances to access to formal services (Okurut et al, 2004).

(d) Livestock ownership and access to credit

This refers to the total number of animals possessed by the household. Livestock is considered as another asset which is liquid and a security against crop failure. As the total number of animals in the household increases, the household would be more likely to go for credit. This can be attributed to increase collateral security. It is anticipated that households who own livestock are better economically than those who do not and thus demand and access more credit. This is evidenced in study by Swiss Agency for Development and Cooperation in 2000 which documented that livestock ownership increases the likelihood of gaining access to credit. Hence this variable was assumed to have positive influence on the dependent variable.

(e) Land size and access to credit

It is the total land size cultivated (it is the sum of owned cultivated land, rented-in land and land secured through sharecropping arrangements) by the household. The larger the cultivated land size the more the labor required that demands additional capital that might be obtained through

credit. The main hypothesis was that the farmer who cultivates larger size of land can utilize more capital and will demand for credit and therefore he/she will be more accessed to credit from the formal sources. Although a positive relationship between land size and access to credit is assumed some studies have shown that farmers with relatively small land size have greater access to formal credit than large land owners. This is mainly true for studies conducted in rural areas where credit program target resource poor small scale farmers (Okurut et al., 2004). However, in other studies such as Diagne and Zeller (2001) landholding size has no effect on access to both formal and informal credit.

(f) Market participation and access to credit

It expected that the farmers' level of participation would increase the likelihood of gaining access to credit. Income and economic welfare of the farmers are determined by agricultural prices, which in turn influence their farm investment and production decision (Benfica, 2006). Therefore, by raising income, markets increase purchasing power, which, in turn, creates demand for credit.

(g) Extension services and access to credit

This refers to the number of contacts with extension agents that the respondent made. Farmers who have a frequent contact with extension agents are expected to have more information that will influence farm household's demand for credit from the formal sources. Therefore, it was hypothesized that this variable positively influences farmer's access to use formal credit. this positive significant relationship is assumed for households who access extension services and access to credit because studies on the demand for credit and savings deposits revealed that factors that increase awareness on the part of household such as household's proximity to an

adequate financial institution, extension services and social groupings are crucial in determining access to formal credit demand because it reduces the transaction costs that hinder households access to credit such as lack of information and availability of credit.

(h) Member of farmer group and access to credit

Member of farmer group means a farmer belongs to an organized farmer association. Since through such groups information and skills sharing is easier, it is anticipated that this variable will have a positive significant effect on the access to credit by smallholder farmers.

3.6.4.3 Diagnostic tests

The Stata command **linktest** can be used to detect a specification error, and it is issued after the **logit** or **logistic** command. The idea behind **linktest** is that if the model is properly specified, one should not be able to find any additional predictors that are statistically significant except by chance. After the regression command (in our case, **logit** or **logistic**), **linktest** uses the linear predicted value (**_hat**) and linear predicted value squared (**_hatsq**) as the predictors to rebuild the model. The variable **_hat** should be a statistically significant predictor, since it is the predicted value from the model. This will be the case unless the model is completely misspecified. On the other hand, if our model is properly specified, variable **_hatsq** shouldn't have much predictive power except by chance. Therefore, if **_hatsq** is significant, then the **linktest** is significant. This usually means that either we have omitted relevant variable(s) or our link function is not correctly specified.

Decision rule

The null hypothesis is that there is no specification error. If the p-value of **_hatsq** is not significant, we fail to reject the null and conclude that the model is correctly specified.

3.7 Ethical considerations

The researcher sought written permission including the purpose for which this data was requested from Uganda Bureau of Statistics. Data was required from UBOS was for academic purposes and confidentiality of responses was assured by coding. The intension for which the results would be used and who would access it was known to the bureau.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter presents and discusses the results of the analysis that has been conducted to address specific objectives of the research. The chapter is divided into three major sections. The first section of this chapter presents univariate analysis of the characteristics of sample farm households and their accessibility to credit. In the second section, bivariate results of the relationship between access to credit and independent variables are analyzed and presented. Finally, the third section presents the multivariate analysis (econometric analysis) that identifies the most important factors that affect smallholder farmers' access to formal credit. It also presents findings and discussion of determinants of households' access to formal financial services results.

4.2. Characteristics of Smallholder Farmer Households

Table 4.2.1 Percentage distribution of discrete variables

Variable	Frequency (N=88,213)	Percentage (%)	Cumulative percent
Age groups			
Below 44 years	65,662	74.4	74.4
Above 44 years	22,551	25.6	100.0
Gender of household head			
Male	44,197	50.1	50.1
Female	44,016	49.9	100.0
Education level of household head			
No education	14,579	16.4	16.4
Primary education	48,579	55.1	71.5
Secondary education	22,983	26.1	97.6
Post-secondary education	2,072	2.4	100.0
Livestock ownership			
Own livestock	31,285	35.5	35.5
Does not own livestock	56,928	64.5	100.0
Land ownership			
Less than 1 hectare	65,406	74.2	74.2
Between 1 & 2 hectares	9,820	11.1	85.3
Greater than 2 hectares	12,987	14.7	100.0
Market participation			
Yes	32,216	36.5	36.5
No	55,997	63.5	100.0
Access to agricultural extension services			
Access to extension	16,511	18.8	18.8
Not access to extension	71,702	81.2	100.0
Social participation			
Member of farmer group	7,650	8.7	8.7
Not member of farmer group	80,563	91.3	100.0

Source: UCA 2008/2009

Results in table 4.2.1 shows that the majority of smallholder farmers (74.4%) are below 44 years of age. This implies that smallholder farmers are still in their productive ages compared to the 25.6% almost a quarter of the total population of smallholder farmers above 44 years of age.

Gender variable in the table above shows that male farmers were slightly higher than female farmers in the sample. Male farmers were more by 0.2%.

In respect to education, it is evident from table 4.2.1 that the majority of farmers had attained primary education (55.1%), followed by 26.1 percent who had secondary education. Those with no education were 16.4 percent and while 2.4 percent had obtained post-secondary education. This implies that 81 percent of respondents were educated.

Livestock is the most important asset for rural households next to land ownership. It is evident in table above that majority of the farmers (64.5%) did not own livestock. This reflects the poverty nature of most households in the farming sector in Uganda.

74 percent of the smallholder farmers owned land less than one hectare, 11% between 1 and 2 hectares and about 15 % owned land greater than 2 hectares. This implies that three quarters of the farmers in the survey are still small in terms of land ownership and this concur with available evidence that land ownership is still major constraint to farmer's productivity and growth.

Market participation was measured by assessing smallholder farmers who were able to sell their produce in the market. The table shows that 36.5 percent of the farmers had managed to sell at 50 percent of the produce. In the agricultural literature this shows that approximately 37 percent of the small holder farmers are commercial farmers. This is because any farmer who can sell 50%

or more of his/her produce is considered a commercial farmer. Hence 63% of small holder farmers are still subsistence farmers.

It is also evident that still few farmers have accessed agricultural extension services provided by both the public and private providers in Uganda. For instance, the results in the table show that only 18.8 compared to 81.2 percent had accessed extension services out of total sample population.

Finally social participation used as a proxy for a smallholder farmer being a member of a farmer group shows that very few farm household had joined farmer groups in the sample. Out of the total sample, only approximately 9 percent were members of farmer groups. Affiliation and involvement in farmer group organization has been noted to increase access to credit since it allows information exchange and access to credit through group lending and SACCOs.

4.3 Access to financial services

Table 4.3.1: Smallholder farmer's access to credit

Access to credit	Freq.	Percent	Cumulative percent
Did not receive loan in last 5 years	78,741	89.3	89.3
Received loan in last 5 years	9,472	10.7	100.0
Total	88, 213	100.0	

Source: UCA, 2008/2009

The percentage of smallholder farmer who accessed credit in the last five years is presented in the table 4.3.1. The result shows that only 10.7 percent of smallholder farmers had received a loan in the last five years. This result concurs with a similar study that used the FINSCOPE survey data which found out that the majority of households in Uganda have not accessed credit

from formal financial institutions. For example, Johnson and Nino- Zarazua (2009) revealed that in Uganda, 18.1 per cent of the population use formal services, only 3.1 per cent use the semi-formal sector as their most formal service and 16.6 uses the informal sector while 62.2 per cent are excluded.

Table 4.3.2: Reasons for not receiving credit from financial institutions

Reasons for not receiving credit	Frequency	Percent	Cumulative percent
no need for credit	12526	14.2	14.2
Unavailability of lending facility	8733	9.9	24.1
Lack of collateral	14291	16.2	40.3
High interest rate	20377	23.1	63.4
Not profitable	11115	12.6	76.0
Ignorance	11468	13	89.0
Negative past experience	9703	11	100
Total	88,213	100.0	

Source: UCA, 2008/2009

The results further shows that out of the total number of farmers that reported having not accessed credit in the last 5 years preceding the survey, majority of the smallholder farmers (23.1%) cited high interest rates, as the main reason as to why they did not receive loans or credit, lack of collateral/security mentioned by the farmers as a reason for not accessing credit was 16.2 percent, farmers who cited no need for credit were (14.2%), those ignorant about of the existence of facilities (13%) while those who did not think it was profitable were 12.6 percent and those citing negative past experience with credit were 11 percent.

4.4 Bivariate analysis

Table 4.4.2: Distribution of credit users and non-users across discrete variables

Variable	Category	Access to credit		Chi-square value	P-value
		Users	Non-users		
		%	%		
Age	Below 44 years	10.85	89.15	33.605	0.000
	Above 44 years	10.3	89.9		
Gender	Female	50	49.9	0.028	0.867
	Male	50	50.1		
Education level	No education	13.6	16.8	94.098	0.000
	Primary	55.1	55.1		
	Secondary	28.5	25.8		
	Post-graduate	2.9	2.3		
Livestock ownership	Yes	38.4	35.1	40.7251	0.000
	No	61.6	64.9		
Land size	Less than 1 hectare	10.53	89.47	17.1781	0.000
	Between 1&2 hectares	10.79	89.21		
	Greater than 2 hectares	11.76	88.24		
Access to Extension services	Yes	34.9	16.8	1.8e+03	0.000
	No	65.1	83.2		
Market participation	Yes	10.55	11.07	5.8148	0.016
	No	89.45	88.93		
Member of farmer group	Yes	13.0	8.2	250.504	0.000
	No	87.0	91.9		

Source:UCA 2008/2009

Age of smallholder household head was significant for both age categories with a p-value =0.000. Age of smallholder house hold head for age categories; below 44 years and above 44 years of farmers who accessed credit was below 15% while those who did not access credit for the above age categories was above 85% as in table 4.4.2

Gender of smallholder farmer is one of the discrete variables that did not significantly affect formal credit use. From the total sample households, 50 percent of the credit users and 50.1 percent of the non-users were male. The non-credit users who are females are slightly lower than male credit users. The difference between the user and non-user groups is not significant at 5% probability level. This is because the p-value of the chi-square test (0.867) is greater than 0.05 at 5 % level of significance.

Education level was statistically significant (p-value=0.000) across all education levels. Percentages of credit users against non-users for education level were; no education (13.6 and 16.8), primary (55.1 and 55.1), secondary was 28.5 against 25.8 while post-graduate was 2.9 and 2.3.

Percentage of smallholder farmers who owned livestock and accessed credit against those who did not access credit but owned livestock were 38.4 against 35.1 percent while those smallholder farmers who neither owned livestock nor accessed credit above 60% as seen in table 4.4.2. Variable livestock ownership was statistically significant (p-value=0.000)

Comparing land size owned by smallholder farmers and access to credit, land size was significant (p-value=0.000) for the land size groupings accessed in the study implying that access to credit will be affected by the size of land owned by the smallholder farmer. From table 4.4.2 above, farmers with land size less than one hectare who accessed credit was 10.5% compared to 89.5% who did not access credit. Land size between 1 and 2 hectares and accessed credit was 11% while 89% did not access credit and for smallholder farmers with land size greater 2 hectares and accessed credit it was 12% while 89% of these did not access credit.

65.1 percent of smallholder farmers who did not access extension services did not accessed credit against 34.9 percent who accessed extension and credit services. Of the farmers who did not access credit, 83.2% were farmers who never accessed extension services. From table 4.4.2 above, the p-value for access to extension variable is 0.000 implying that the access to extension services is significant for access to credit by smallholder farmers.

Market participation for smallholder farmers and access to credit was statistically significant (p-value=0.016 <0.05) in relation to access to credit. Of the smallholder farmers who accessed credit, 10.55% participated in the market while the remaining 89.45 did not participate in the market. Among the smallholder farmers who did not access credit, there were more smallholder farmers (approximately 89%) who had not participated in the market compared to the 11.07% who had participated in the market.

Although being a member of farmer group was found to be a significant variable (p-value=0.000), only 13% of smallholder farmers who accessed credit were members of a farmer group. Among the smallholder farmers who did not access credit, approximately 92% were not members of a farmer group.

4.5 Diagnostic test for model-specification

Table 4.5.1: Results of specification error test (linktest)

Credit	Coefficient	Std. Err.	Z	P-value	[95% Conf. Interval]	
_hat	-0.475	0.260	-1.820	0.000	-0.98482	0.035126
_hatsq	-0.387	0.068	-5.690	0.483	-0.51967	-0.25333
_cons	-1.307	0.235	-5.550	0.257	-1.76823	-0.84565

Source: UCA, 2008/2009

Prior to running the logistic regression model, model specification was checked. STATA 12.0 has an in-built command `linktest` that can be used to detect a specification error and it is issued after the `logit` or `logistic` command. The linktest results displayed above (Table 4.5.1) shows that the predicted residuals of model ($\hat{\mu}$) are statistically significant, $p\text{-value}=0.000$ while the ($\hat{\mu}^2$ variable) are not statistically significant at 5% level of significance since the $p\text{-value}$ is greater than 0.05. This confirms that the model had meaningful independent variables and model is correctly specified.

4.6 Determinants of smallholder farmer's access to credit

Logistic regression analysis was conducted to ascertain the factors that contribute significantly to credit accessibility. Access to credit variable (*whether an individual has accessed credit or not*) was regressed on seven (7) hypothesized variables age, land size/farm size, market participation, education, livestock ownership, access to extension services, and member of farmer group. The results of the logit model with odd ratios are presented in the table 4.5.2 below.

Table 4.5.2: Logit regression results for determinants of access to credit by smallholder farmers

Credit	Odds Ratio	Marginal effect	Std. Err.	z	p-value
Above 44 years (Base:<44 years)	0.942	-0.006	0.0261	-2.15	0.032
Primary (no education)	1.183	0.016	0.041	3.930	0.000
Secondary	1.267	0.022	0.049	6.13	0.000
Post_secondary	1.463	0.036	0.107	5.20	0.000
Does not_livestock (base: Does own livestock)	0.923	-0.008	0.022	-3.32	0.001
Land size (Base: <1 hectare)					
Between 1&2 hectares	0.983	-0.002	0.035	-0.49	0.621
Greater than 2 hectares	1.119	0.011	0.034	3.70	0.000
Market participation (Base: Non-market participation)	1.1010	0.001	0.023	0.45	0.650
Access_extension (base: no access)	2.556	0.088	0.061	39.34	0.000
Member_farmgroup (base: not member)	1.412	0.032	0.049	9.87	0.000
Constant	0.091		0.004	-50.61	0.000

Note: Base categories for categorical dummies are in brackets

Source: UCA, 2008/2009

The results in table 4.5.2 shows that six of the seven variables hypothesized to determine smallholder farmer's access to credit were found to be statistically significant in explaining smallholder farmers access to formal credit.

4.6.1 Social demographic factors

4.6.1.1 Age of the household head

Age had a significant effect on credit. This finding is consistent with the earlier results of Okurut et al. (2004) which resolved that age is an important variable influencing access of households' heads to credit. Age has odd ratio value of 0.942 (>44 years). This value is less than one implying that the odds of accessing credit for smallholder farmer decreases with age above 44 years of age. That is older farmers are disadvantaged when compared with young smallholder farmers as far credit access is concerned. This picture is clear when we consider the marginal effect. Age has marginal effect of 0.006 implying that a unit increase in age of smallholder farmer from 44 years of age will reduce the probability of accessing credit by 0.006. The result does differ from arguments in literature that have stressed that older households may access more credit than young ones because they own more resources, having more experience and better reputation than young people. However, this finding concurs with some new evidence which argued that young household heads adopt quickly new technologies and are willing to take risks. Since credit acquisition is a risk, therefore these demand more credit than their old counterparts.

4.6.1.2 Education level

Not only did all the education dummies have odd ratios greater than one but are increasing as one as one advances up the education ladder. Level of education had a positive significant relationship ($p\text{-value}=0.000$) with access to credit by a smallholder farmer. For example, primary education has 1.18, secondary education, 1.27 and post-secondary 1.46 when compared with no education. This implies that the probability of accessing credit for smallholder farmer increases

with education. The marginal effects results show that having attained primary education other than no education increases the probability of accessing credit by 1.2 percent, secondary education by 2.2 percent and post-secondary by 3.6 percent. The positive significant effect of education on access to credit was expected because it is believed that chances to access credit from formal and quasi-formal financial institutions improve with increase in levels of education (Kashuliza *et al*, 1998).

Education level of household head had a greater effect on access to credit by smallholder farmers compared to age of the household head among social demographic factors analyzed. This is attributed to the fact that the level of education (primary, secondary and postsecondary) all had odds ratios greater than one and this increased with higher education level attained.

4.6.2 Economic factors

4.6.2.1 Livestock ownership

P-value=0.001 for livestock ownership is an indication of a significant variable to access of credit by smallholder farmers. Livestock ownership was used as proxy for asset ownership and the odd ratio for not owning livestock was less than one (0.923). This implies that the probability of accessing credit for smallholder farmer reduces for farmers who do not have livestock compared with those who have livestock. Marginal effect of 0.008 implies that the probability of accessing credit by farmers who do not own livestock reduces by 0.008. This study concurs with other findings which found that wealthier farm households (livestock ownership increases the likelihood of gaining access to credit IFAD 2003) are better positioned to access credit than poorer households.

4.6.2.2 Land size

Land size for smallholder farmers with land size between 1 and 2 hectares had an odds ratio 0.983 less than one and was statistically not significant (p -value=0.621). An odd ratio less than one (0.983) implies that the odds of accessing credit decreases with a unit change in land size for farmers (between 1 and 2 hectares). The marginal effect result shows that a unit increase in land size for smallholder farmers with land in the category between 1 and 2 hectares will result into a 0.002 reduction in the probability of accessing credit by smallholder farmer. Farmers with land size greater than 2 hectares was positively significant p -value = 0.000 and an odds ratio 1.119 when compared to farmers with land less than 1 hectare implying that the probability of access to credit by smallholder farmers increases with land size greater than 2 hectares. From the marginal effect of 0.001, it shows that having land size of more than 2 hectares compared to land less than one hectare increases the probability of access credit by 1.1%. This positive significant effect on large land size on access to credit was expected because it has been argued in the literature that land can be used as collateral for formal credit and that farming households with large size of land would have a higher repayment capacity and therefore more chances of getting formal credit.

Therefore, landholding (size of owned land) less than 2 hectares having negative significant effect on access to credit imply that farmers with relatively small land asset have lesser access to formal credit than large land owners. The result further conforms to the focus of rural credit in Uganda which has targeted at the resource poor small scale farmers. However this result is not in line with the findings of Okurut et al. (2004) and also deviated from Diagne and Zeller (2001) where landholding size has no effect on access to both formal and informal credit.

4.6.2.3 Market participation

Although market participation by smallholder farmers had an odds ratio of (1.101>1) implying that the probability of accessing credit of smallholders would increase for those smallholder farmers who participate in the market than those who do not participate in the market and the marginal effects result showed that the probability of accessing credit by smallholder farmers who participated in the market was higher by 0.02 when compared to smallholder farmers who did not participate in the market, market participation as a variable was not significant at 95% confidence interval (p-value=0.650)

As seen above, farmers with farm size greater than two hectares and those with livestock were the economic factors found to be significant. Farmers with farm size greater than 2 hectares had a greater significance to credit access (odds ratio= 1.119) compared to non livestock ownership (odds ratio=0.923)

4.6.3 Institutional factors

4.6.3.1 Access to agricultural extension services

Access to agricultural extension services was significant (p-value=0.000) with an odds ratio for access to extension services is greater than one (2.556) implying that the probability of accessing credit by smallholder farmers is higher for those farmers who have accessed agricultural extension services than those who have not accessed agricultural extension services. That is farmers who have accessed agricultural extension services have 2.6 times higher to chances of getting credit than those who have not accessed agricultural extension services. The marginal effects result demonstrate that the probability of accessing credit by smallholder farmer who accessed agricultural extension services is higher by 0.09 when compared to the smallholder

farmer who has not accessed agricultural extension services. This finding demonstrates the importance of agricultural extension services to rural farmers. Empirical evidence show that awareness on credit availability has positive significant relationship with access to credit because those individuals who are aware of the availability of credit services have better chances to access credit than those who are not aware (Mohamed, 2003). In a related study, Kashuliza *et al* (1998) pointed out that awareness of farmers on the available credit facilities in their areas are important factors in determining access to credit. Indeed, access to extension services by smallholder farmers raise their awareness and also cause the demand for credit. The results of study by Omonona et al. (2008) found that access to extension services increases access to credit and reduced credit constraint condition of farmers. In Uganda under NAADS, credit is one of the component NAADS services. Government avails credit to farmer groups in addition to awareness training on how and where to get agricultural credit.

4.6.3.2 Membership to a farmer group

A positive significance exists between a smallholder farmer being a member of a farmer group and access to credit ($p\text{-value}=0.000$). The odd ratio (1.412) of membership to farmer group is more than one, implying that the probability of access to credit by smallholder farmers increases with being member of farmer group. The marginal effect result of 0.032 shows that a farmer being a member of any farmer group increases his/her probability of accessing credit when compared with farmer who is not a member by 3.2 percent. The role a farmer group in accessing credit is undisputed in the literature. For example, this finding is consistent with the result of Omonona et al. (2008) which found that belonging to local level institutions increases access to credit and reduced credit constraint condition of farmers.

Although both the access to extension services and being a member of farmer group as institutional factors had odds ratio >1 (2.556 and 1.412) for extension services and member group respectively, a smallholder farmer who accessed extension services had more chances to credit access compared to one who was a member of farm group as seen by values of their odds ratios.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, conclusions and recommendations from the findings of the study. The findings are basically presented in line with the objectives of the study.

5.2 Summary of findings

The main objective of this study was to examine the determinants of smallholder farmer's access to formal financial services in Uganda. Independent variables (age, gender, education level, asset ownership, farm/land size, member of farmer group, access to extension services and market participation) were subjected to descriptive analysis, bivariate analysis using the chi-square and multivariate analysis using the logistic regression to ascertain the effect of these independent variables on the access to credit the dependent variable and the results from the logistic regression were;

Smallholder farmers with age above 44 years had an odds ratio of 0.942 and a p-value of 0.032.

Education dummies had odds ratios of 1.183, 1.267 and 1.463 for primary, secondary and post-secondary levels of education respectively. All levels of education analysed had p-values of 0.000.

Livestock ownership variable had an odds ratio of 0.923 and p-value of 0.001 for farmers without livestock in comparison to smallholder farmers with livestock.

Land ownership between 1 and 2 hectares had an odds ratio of 0.983 and p-value=0.621 in relation to those who own land less than one hectare while smallholder farmers with land size greater than 2 hectares compared to those who had less than an hectare had an odds ratio greater than one (1.119) and p-value=0.000 indicating statistical significance.

Market participation by smallholder farmers who participated in the market and those who did not participate in the market had odds of 1.101 and p-value of 0.650 a value greater than 0.05 implying non significance of market participation by smallholder farmers to access to credit.

Access to extension services by smallholder farmers in the study had an odds ratio 2.556 and p-value of 0.000 as shown in table 4.5.2.

Smallholder farmers who were members of a farm group against those farmers who were not members of any farm group had an odds ratio of 1.412 and p-value=0.000

5.3 Conclusions of the study

From the findings, smallholder farmers aged 44 years and above had an odds ratio less than one (0.942) meaning that a unit increase in age would reduce their chances of accessing credit by 0.6 percent therefore, younger farmers (below 44 years) had a better chance in accessing credit as compared to the older farmers.

Education variable categorized into three categories of primary, secondary and post-secondary were all positively significant to access to credit. The chances of accessing credit by smallholder farmers got higher as a farmer attained higher education levels. Among the post-secondary level,

farmers had a better chance of 3.6% compared to 1.6% for a farmer who attained primary level education.

Access to formal credit for farmers who do not own livestock was found to be significant with odds ratio less than one implying farmers who did not own livestock had 0.8 percent less chances to access credit. This is true because in some cases, livestock has acted as security for farmers who may wish to access credit.

Smallholder farmers with land size greater than 2 hectares had 1.1 percent more opportunity to access credit as compared to farmers with land size less than two hectares. This could be attributed to the fact that land can be used as collateral and therefore the bigger the land the higher the chance of securing formal credit.

Access to credit by smallholder farmers had a positive significant relationship with farmers who accessed extension services implying that farmers who accessed extension services were 2.56 times more likely to access credit as compared to those smallholder farmers who did not. This may be so because there is always information flow among farmers and extension staff on opportunities available meaning farmers who do not access such services miss out on such information which would be disadvantageous.

Smallholder farmers who were members of a farm group had a positive significant relationship with access to credit. Being a member of farmer group meant that a farmer had 1.4 times higher chances to access credit compared to a farmer who was not a member of a farm group.

5.4 Recommendations of the study

Age was found to be a significant factor in determining access to credit and younger farm households had more advantage than older farmers with respect to access to credit. This implies that efforts to ensure sustainable agricultural production should be targeted at the active population who are relatively young to carry out the business of farming. There is therefore the need for policy support for improved credit access, empowerment and more active involvement of the youth and younger population. This would also serve as a succession arrangement to ensure that there is an improvement in agricultural production.

Education of household head had a positive significant relationship with access to credit. From the study, the more education one attained the better the chances to access credit. This would therefore mean that government programs such as Universal Primary Education (UPE), Universal Secondary Education (USE) and Universal Tertiary Education is supported and promoted. This is because formal education was found to enhance people's comprehension and absorption capacities.

Logistic regression analysis found out that none ownership of livestock by a smallholder household had a marginal effect of 0.008 implying that the probability of not accessing credit by farmer who does not own livestock reduces by 0.01. Livestock is considered another asset which is liquid and a security against crop failure. Holding to the fact that smallholder farmers rely on nature, there is need to have a fallback position that will not only rescue you credit when used as security but can also provide backstopping when natural calamities do not favor crop production.

Smallholder farmers (74.2 percent) reported having land size less than one hectare (table 4.2.1) and yet land is a significant variable in accessing credit. Farmers therefore need to find innovative ways of utilizing the existing land to ensure better yields that would fetch them more money to enable them buy more land and those who can afford, they should utilize the opportunity of leased land from landlords with bigger land so that they increase their cultivatable hectare hence more money that would facilitate their acquisition of more land.

From the results, it was found that access to extension services had a positive significance to access to credit. However literature states that coverage is low and biased towards better off farmers (Peacock & Jowett, 2006). In this regard, extension services need to be decentralized from sub county level to parish then later village level. This is because at sub county, coverage and the population is much bigger which would limit access of this much needed services by the poor smallholder farmers because of the long distance from their villages. Individual farmer needs can't be meant in such an arrangement and besides at the moment the production level is at the village level and not sub county implying that extension services should be at village level and not sub county.

Group membership of smallholder farmers does not only make sharing of skills and experiences possible, it also enables easier information sharing among them. Farmers therefore need to be encouraged to form and join farmer groups especially within their localities because they will most likely face the same challenges besides there are more advantages that accrue to group members when it comes to accessing services i.e. use of the saving and credit cooperatives that utilizes the group mechanism in accessing credit for it is easier to monitor a group than an

individual and the groups could also be fronted as security whenever it is needed. Due to its positive significance to access to credit by smallholder farmers, it should be encouraged.

Furthermore, the study found that only 10 percent of smallholder farmers had received a loan in the past years preceding the survey. This implies that access to credit among the farming households is still poor and something has to be done. It is thus recommended that the credit policy for rural and micro-enterprise lending needs to be formulated in order to mobilise savings and maximize the availability of credit to the farming population in rural areas of Uganda. Efforts and interventions are required to enable the banks to make unsecured loans and to allow loans to be made available to potentially productive activities.

The existing commercial banks need to be encouraged to lend to smallholder farmers and micro-enterprise sector. The government in collaboration with various development partners should consider the possibility of establishing a specialized credit institution to cater for specific credit and saving needs of the smallholder farmers and micro- enterprises. In short term, the government need to support the already existing commercial banks and other financial service providers through grants and infrastructure development to allow them expand their service to uncovered remote areas. These efforts should make bank loans more accessible and affordable to small borrowers. Where, the establishment of a wider network of bank branches to serve the farming sector may not be possible to the banking institutions, formation of cooperatives, farmers associations or other forms of group responsibility for the administration and supervision of credit programmes at the local level should be promoted. Group lending approach may not only reduce the high overhead costs associated with small lending but may also encourage the

establishment of good credit culture and help in achieving acceptable loan repayment levels. The emergence of saving and credit cooperatives (SACCOs) and saving and credit groups offers an excellent opportunity as a starting point for the use of group mechanism in accessing credit to the small holder farmers.

Policies to enhance the role of informal credit institutions to bring about closer linkage between formal and informal institutions should be formulated. Better linkages would enable banks to benefit from the outreach and local knowledge of informal agents, expanding financial savings mobilization and credit delivery and improving the overall efficiency of the financial system.

5.5 Areas of further research

One of the limitations of this study was that the dependent variable (access to credit) was a binary outcome, measuring whether a farmer accessed credit or not. However, it has been noted such measure of access to credit underscores the amount of credit a farmer got which is more important than just accessing credit. Therefore, this study recommends other studies that can analyse the determinants of access to credit using the amount of credit obtained would be more meaningful.

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