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**ACCESS TO CREDIT BY SMALLHOLDER CANE FARMERS:**

**A case study of Butere/Mumias District - Western Kenya**

**UNIVERSITY OF NAIROBI**  
EAST AFRICANA COLLECTION

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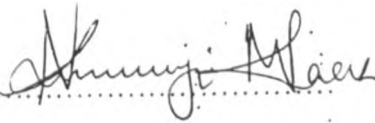
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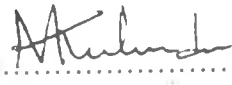
## Declaration

This research paper is my original work and has not been presented for a degree in another university.


Signed 

Malack Makunda Namai

This research paper has been submitted for examination with our approval as university supervisors.

Signed 

Dr. Damiano Kulundu Manda

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I remain responsible for any errors in the paper.

## **Dedication**

**Dedicated to:**

**McTony, mcAlvin and mcDenise and Priscah Akafwale may God bless you.**

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## **Abstract**

Agriculture remains the backbone of the Kenyan economy given its contribution to employment, foreign exchange, food and its linkages with other sectors of the economy. Indeed the sector's performance directly mirrors that of the overall economy.

This study assessed the relationship of credit institutions' lending policies in determining access to credit by smallholder cane farmers in Mumias sugar scheme. Primary cross-section data was collected and analyzed using logit regression model.

The results of the study show that the inaccessibility of credit reflects lack of supply, resulting from the rationing behaviour of credit institutions based on the farmer's education status, farm size, time taken to process credit, account requirement, repayment method, restrictions on credit use and credit amounts. The study concludes that given the established network of credit institutions, improving lending terms and conditions in favour of the smallholder farmers would provide an important avenue for facilitating their access to credit. Similarly, access to credit by smallholder farmers can be increased by educating farmers, timely issue of credit funds, improving the repayment method and increasing the amount of credit.

## Acronyms

A.F.C	Agricultural Finance Corporation
A.I	Artificial Insemination
F.A.S	Farmers Advance Scheme
GDP	Gross Domestic Product
K-REP	Kenya Rural Enterprises Programme
KTDA	Kenya Tea Development Authority
LDCs	Less Developed Countries
MLE	Maximum Likelihood Estimates
MSC	Mumias Sugar Company
MOCO	Mumias Outgrowers Company
MOSACCO	Mumias Outgrowers Savings and Credit Cooperative
NGOs	Non Governmental Organizations
ROP	Rural Outreach Programme

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## CHAPTER ONE

### 1.0 Introduction

Agriculture is central to economic growth in Africa. As in many countries in sub-Saharan Africa, agricultural sector contributes the largest share of Gross Domestic product (GDP) in Kenya. The sector generates about 60 percent of the country's foreign exchange and provides employment to about 70 percent of the total population. It provides nearly all the food requirements for the nation and the bulk of the raw materials needed in the industrial sector. However, the contribution of agriculture to (GDP) has declined from 40 percent in 1963 to only 23 percent in 2002. (See table 1.0 below)

Table 1.0 Agricultural GDP as a share of total GDP (1990-2001)

Year	Agricultural GDP \$ Million (constant 1982 prices)	Total GDP \$ Million (constant 1982 prices)	Agricultural share in GDP
1990	1,192.04	4,223.63	28.2
1991	1,178.93	4,311.50	27.3
1992	1,134.83	4,332.22	26.2
1993	1,088.49	4,342.79	25.1
1994	1,119.29	4,474.58	25.0
1995	1,173.32	4,690.13	25.0
1996	1,225.05	4,907.59	25.0
1997	1,240.05	5,022.56	24.7
1998	1,256.08	5,112.60	24.6
1999	1,271.25	5,185.10	24.5
2000	1,244.80	5,172.82	24.0
2001	1,259.80	5,234.85	24.0

Source: Republic of Kenya, statistical abstract, (2002).

While the agricultural sector performed exceptionally well in the early years of independence, its performance in recent years has been dismal. From an average of 6 percent in the 1962-72 period, the sector has dramatically declined, to below 2 percent in the 1990s. In the more recent past, the sector has dramatically declined, recording a rate of -2.4 percent in the year 2000 down from 1.2 percent in 1999. As

a sector that is intricately linked to the rest of the economy, its performance affects other sectors and the overall well being in the country.

Despite the importance of agricultural sector in the economy, scarcity of productive land coupled with high population growth rate is a major concern. For instance, the population density in Butere/Mumias district was 546 persons per sq. km in 1999, but it is projected to be 600-700 persons per sq. km in 2009.

If agriculture has to continue playing a leading role in the economy, productivity must be increased. The dominant smallholder sub-sector has been identified by the government as a priority area that can contribute to raise agricultural output, employment and per capita income.

However, the smallholder households characterized by landholdings of less than 1 hectare and very low crop yields, are unable to increase productivity even though they focus much effort on food crop production. For these households, there is need for land use intensification and development of the marginal lands. But land use intensification involves the use of improved inputs such as fertilizers, seeds, herbicides, insecticides, equipment and crop as well as livestock husbandry practices. Access to credit has been suggested as a policy alternative for alleviating their food insecurity, poverty and to improve per capita income.

Agricultural credit is usually given in kind, in cash or in a combination of both. In kind credit is given in material form, e.g., in the form of fertilizers, improved seed varieties and pesticides among other things such as, land preparation, harvesting and transportation.

There are three types of agricultural credit: short term, medium term and long term credit. These three are based on the length of time for which the loan is extended. Generally, short-term credit takes less than two years, medium-term takes between two and ten years and long-term credit takes more than ten years. For example, Agricultural Finance Corporation (AFC) credit services are classified as: short term loans-up to three years, medium term loans-four to seven years and long term loans-

eight to thirty years. In most cases short-term credit is lent to farmers for crop planting and to meet recurrent cost of livestock production and other expenditures. Medium term credit is lent for the purchase of farm machinery and equipment, purchase of livestock, planting and raising of perennial cash crops and making small permanent structures on the farm. Long-term credit is lent for the purchase of land or for making costly permanent farm improvements.

Agricultural credit to smallholder farmers comes from different sources. In Kenya, credit to smallholder farmers is made through credit institutions, mainly (AFC) and Cooperative Bank of Kenya (CBK) and credit schemes sponsored by aid agencies and by the government through the ministry of cooperative development and agriculture. Informal credit involving credit from relatives and friends, moneylenders and rotating credit associations are also of major importance. In the smallholder, borrowing from these informal institutions is common. This kind of borrowing does not impose formalities required by formal institutions. The borrower talks directly to the lender without any formal procedure. Interest rate may or may not be charged on the borrowed funds. Moneylenders fall under commercial lenders and hence charge very high interest rates. Despite the informal sector contribution, its national value cannot be easily quantified.

Smallholder farmers' access to formal credit could enhance production, marketing and long-term investment needs. It is however, noted that 67 percent of all farmers- 86 percent of those not in a co-operative do not access any form of cash or in-kind credit. Of those receiving, a majority 52 percent got credit from their co-operatives marketing organizations like Kenya Tea Development Authority (KTDA) and Mumias Out Growers Company (MOCO) accounted for 14 percent of loans, traders, shopkeepers and input distributors 12 percent and relatives and friends another 11 percent (Argwings-Kodhek, 1998).

In order to keep up with technological developments, farmers must increase capital investment in farm equipment. In addition, they must meet increased annual

operating expenses for fertilizers and improved seeds. If smallholder farmers are to achieve the necessary and desirable adjustments, accessibility to credit is essential. Most of the existing formal institutions do not adequately cater for the credit needs of smallholder farmers due to their lending terms and individual farmer's characteristics. Despite efforts to overcome credit accessibility problems, especially by the government and aid agencies, one of the setbacks of smallholder farmers credit programs has been credit inaccessibility as evident from the 1960's when the credit programs expanded.

#### **i) The Development of Agricultural Credit in Kenya**

Farmers' participation in agricultural credit in Kenya started way back in 1931, when land and Agriculture Bank (vide the land and Agriculture Bank Ordinance of that year: ordinance number 3 of 1931). During this period of economic depression, the decision aimed at raising and ensuring supply of raw materials and food and the bank provided long-term loans. Initially Kenyan farmers were not allowed to borrow until 1963 when the amendment to the land and agricultural bank ordinance was passed and the land and agricultural bank (amendment) ordinance led to the formation of the Agricultural Finance Corporation (AFC). Later the ordinance changed to the agricultural credit Act.

In 1969, experience led to the repeal of the agricultural credit Act, and the enactment of the (AFC) Act, that saw the amalgamation of the (AFC) with the land and Agriculture Bank. The government's aim was to assist Kenyan farmers engaged in large-scale farming and hence promote productivity.

Consequently, the Kenya government's policy on agricultural credit has since independence remained outstanding as is evident from the development plans. In the first development plan (1966-1970), the government target was to expand public credit to smallholder agriculture principally to stimulate output of dairy and beef cattle, cotton, coffee, tea, hybrid maize, beans, pineapples and potatoes. The second plan (1970-1974) envisaged that in the long run public credit institutions would become less important as private credit institutions become more active and vibrant.

The third plan (1974-1978) proposed the expansion of agricultural credit programs as a tool to promote the development and intensification of agricultural production and transfer farms from colonial masters to Kenyans.

The fourth plan (1979-1983), fifth (1984-1988) and sixth plan (1989-1993) focused attention on the means to expand agricultural credit. Specifically, the central bank directed commercial banks to allocate not less than 17 percent of their total deposit liability to agriculture and non-bank financial institutions to allocate 10% in the fifth plan.

The seventh plan (1994-1998) and the eighth plan (1999-2003) have clearly taken into consideration the matters of farm credit. The National Rainbow Coalition (NARC) government has clearly stated that agriculture will be revived and developed. By reviewing (AFC) interest rates from 20 percent to 10 percent in the year 2003 with clear guidelines on appraisal services to avoid default cases, there seems to be a clear policy strategy to the sector. It is therefore, evident that small farm credit has formed major part of the government's agricultural policy agenda since independent.

#### **ii) Institutions influencing agricultural credit.**

Knowledge of the relationships of the institutional components are necessary if planning personnel can reasonably expect to organize and operate agricultural credit institutions so that farmers can employ credit productively, benefit from its use, and increase the rate of agricultural development. To be effective, agricultural credit institutions must fit into the financial structure in the region where they are being established.

These institutions must operate initially in a given marketing organization, structure and performance. Also, the suitability, availability and price of off-farm inputs (capital) must be known in order to establish operating procedures of the agricultural credit institution that will work. These marketing and farm input institutions are

influenced by the social structure, educational, cultural patterns and traditions within their set up.

The influence of the land tenure system upon the type of agricultural credit institution to be established, that is, "If the primary agricultural producer is part of an extended family and is farming communally-owned land, or if the farm producer is smallholder who is either renting farmland from large scale farmers, then the credit institutions that requires farmland as security for credit will not operate. On the other hand, if agricultural producers are freeholders and hold title to the land, even though the acreage or size of a unit may be small, real estate may be taken as security for credit."

The types of credit must reflect the basic kinds of agricultural production in the area. In many countries, the basic types of agricultural production vary from region to region, thus requiring different types of credit and operating procedures for different areas within the same country. If the major types of crops in a region are annual grain crops, the major type of credit used for annual operating expenses should be accessible. In this situation, if the market is adequate, the farmer is expected to be able to repay the credit from the proceeds of the sale of the farm products. If, on the other hand, the annual crops are primarily domestic food crops, with a very limited market, and the major income producing crops, such as, tea, coffee and sugarcane then the agricultural credit institution will need to lend for two to five years before income can be earned and the loan repaid. The eligibility requirements could also limit prospective borrowers to those farmers with 'x' number of acres of crop in production in order to obtain along term loan.

### iii) The role of credit

It is generally agreed among researchers and policymakers that smallholder farmers in developing countries do not access adequate credit. This lack of adequate access to credit is in turn believed to have significant negative consequences for various aggregate and household-level welfare outcomes, including technology adoption, agricultural productivity, food security, nutrition, health, and overall household

welfare. Access to credit affects household welfare outcomes through the following three ways (Zeller et al. 1997).

The first way is through the alleviation of the capital constraints on agricultural households: expenditures on agricultural inputs incurred during the planting and vegetative growth periods of crops, whereas returns are received only after the crops are harvested several months later. Most farm households show a negative cash flow during the planting season. Therefore, to finance the purchase of essential consumption and production inputs, the smallholder farmer must either dip into his savings or obtain credit. Access to credit can therefore significantly increase the ability of these farmers with little or no savings to acquire agricultural inputs. Furthermore, easing potential capital constraints through the granting of credit reduces the opportunity costs of capital-intensive assets relative to family labour, thus encouraging the adoption of labour-saving, higher-yielding technologies and therefore increasing land and labour productivity, a crucial factor in encouraging development, in particular in many African countries (Zeller et al. 1997).

The second way is that access to credit affects smallholder household's welfare by increasing its risk-bearing ability and by altering its risk-coping strategy.

The third effect of access to credit for investment and consumption smoothing is closely linked to the second, and we therefore discuss them together because they both affect the resilience of smallholders in bearing production and investment risks. The mere knowledge that credit will be available to cushion investment against an income shortfall if a potentially profitable, but risky, investment turns out may induce a farmer to bear the additional risk. The household may therefore be willing to adopt new and riskier technologies.

A farmer may also benefit from mere access to credit even if he is not borrowing, because with the option of borrowing he can avoid adopting such risk-reducing but costly strategies. This study will provide vital information that will enable effective

measures to be undertaken to enhance credit access and hence raise farm productivity.

**iv) Definition of access to credit**

Access to credit is often confused with participation in credit programs. Indeed the two concepts are used interchangeably in many studies. However, to analyze satisfactorily the socioeconomic determinants of access to credit and participation in credit, one needs to make the distinction between access to credit, participation in credit programs and being credit constrained. A smallholder farmer has access to a particular source of credit if he is able to borrow from that source, although for a variety of reasons he may choose not to. The extent of access to credit is measured by the maximum amount a household can borrow (its credit limit). If this amount is positive, the household is said to have access. This farmer is said to be participating if he borrows from that source of credit.

**1.1 The research problem**

Smallholder farmers are an important contributor to the Kenyan economy. The sector contributes to the national objective of creating employment opportunities, generating income and providing a source of livelihood for the majority of low-income households in the country (ROK, 2002), accounting for 23 percent of GDP. With about 70 percent of smallholder farming activities located in rural areas, the sector has a high potential for contributing to rural development. The majority of farmers in this sector are considered uncreditworthy by most formal credit institutions. Whereas some NGOs finance an increasing number of smallholder activities, most formal institutions still deny this sector access to their credit services.

Improving the availability of credit facilities to this sector is one of the incentives that have been proposed for stimulating its growth and the realization of its potential contribution to the economy (ROK, 2002). Despite this emphasis, the effects of existing institutional lending terms and conditions on access to credit have not been empirically addressed. In addition, there's no empirical case study indicating the



potential role of improved lending policies by the formal institutions on access to credit markets.

Although the existing formal credit institutions have proved relatively successful in meeting the credit needs of this sector, their limited resources do not serve the sector's credit needs. This is because as smallholder activities expand in size, the amount of credit required becomes increasingly difficult for the existing sources to satisfy, yet they still remain too small for commercial formal lenders (Aryeetey,1996a). Studies on financial markets in Africa have shown that credit markets are segmented and unable to satisfy the existing demand for credit in rural areas. Whereas for informal markets it is the limited resources that bring the constraint, for the formal sector it is the difficulty in loan administration that is the problem (Atieno, 2001). A relevant problem for investigation is that of the factors determining access to credit by smallholder farmers.

## **1.2 Research objectives**

The objectives of the research are to study the determinants of access credit by the smallholder farmers. The specific objectives are:

- i. To analyze the determinants of access to credit in smallholder farming,
- ii. To determine the relative importance of these factors on access to credit and
- iii. To draw policy implications for access to credit by smallholders in Kenya.

## **1.3 Significance of the study**

Lessons drawn from the study will enable the policy makers to decide on the best approaches to adopt in:

- i.) Improving access to credit, particularly to the needy Smallholder farmers without jeopardizing the viability of the formal financial institutions.
- ii.) Encouraging savings mobilization, which should be emphasized not only for credit but also as a means of instilling a more disciplined credit market.
- iii.) Increasing the competitiveness among providers and users of credit services in the rural areas and
- iv.) Ensuring the sustainability of special credit schemes.

## 1.4 Hypothesis

The study tested the following hypothesis:

$H_0$  = Institutional and individual farmer characteristics do not determine access to credit by smallholder cane farmers.

## CHAPTER TWO

## 2.0 Literature review

A number of studies relating to credit in smallholder agriculture have been carried out in Kenya and other developing economies. The studies give different views on access to credit performance but they have some common observations.

An increasing number of researchers have attempted to explain the functioning of credit markets using new econometric techniques. Challenging the paradigm of competitive equilibrium, they have explored the implications of incomplete markets and imperfect information for the functioning of credit markets in developing economies.

Floro and Yotopoulos (1991), provide an empirical assessment of rural credit within the framework of information economics (the new institutional economics). They justify this framework on the basis that information imperfections are pervasive and important in less developed and rural areas. The study begins with testable prepositions about the price-quality theorem of credit markets in the developing economies. This theorem states that an increase in the rate of interest for equating supply and demand is likely to affect loan quality by reducing the probability of repayment. That's, high-quality borrowers will seek credit elsewhere or depart from the market altogether, leaving only borrowers who are more likely to default on their obligations. Their empirical investigations go beyond price adjustment and collateral requirements. They point out that both lenders and borrowers are heterogeneous and have the same problems of sorting information, providing incentives and enforcing repayment. They begin by explaining that risk originates with the borrowing (not lending) of formal financial institutions.

Stiglitz and Weiss (1981) form the basis of the attempts to explain the foundation of credit rationing in credit markets. In their explanation, interest rates charged by a credit institution has a dual role of selecting potential borrowers (leading to adverse selection), and affecting the actions of borrowers (leading to the incentive effect).

Interest rates therefore affect the nature of the transaction and not necessarily clear the market. Both effects are due to the imperfect information inherent in credit markets. Adverse selection occurs because lenders would like to identify the borrowers most likely to repay their loans since the lenders' expected returns depend on the probability of repayment. In an attempt to sort out borrowers with high probability of repayment, lenders are likely to set interest rates that an individual is willing to pay as a screening device. However, individual willing to pay high interest rates may on average be risky; therefore as interest rates are set high, the riskiness of those who borrow also increases, reducing the lenders profitability. The incentive effect occurs because as the interest rate and other terms of lending change, the behaviour of borrowers is likely to change since it affects the returns on their projects. They further show that higher interest rates induce firms to undertake projects with lower probability of success but higher payoffs when they succeed leading to the problem of moral hazard.

Due to imperfect information in the credit markets, financial institutions will formulate terms and conditions of lending to induce borrowers to take actions in the interest of the lender and to attract low risk borrowers. The result is an equilibrium rate of interests at which the demand exceeds supply. Other terms of the credit contract, like the amount of collateral, will also affect the behaviour of borrowers and their distribution, as well as the return to the lending financial institutions. Raising the price for credit or collateral in a situation of excess demand is not always profitable, and these will deny loans to certain borrowers.

Besley (1994), based on the same of argument, analyses the rationale for interventions in the rural credit markets in the presence of market failure. Given that imperfect information and high costs of contract enforcement characterize credit markets, an efficiency measure as exists in a perfectly competitive market will not be an accurate measure against which to define market failure. These problems lead to credit rationing in credit markets, adverse selection and moral hazard. Adverse selection arises because in the absence of perfect information about the borrower, an increase in the price for credit encourages borrowers with the most risky projects,

and hence least likely to repay, to borrow, while those with the least risky project cease to borrow. Interest rates will therefore play the allocative role of equating demand and supply for credit, and will also affect the average quality of lenders' loan portfolio. Lenders will set the interest rates at a lower level and ration access to credit. Imperfect information is therefore important in explaining the existence of credit rationing in the rural credit markets.

Bell (1990) demonstrates that incomplete information or imperfect contract enforcement generates the possibility of loan default and eventually problems of credit rationing. The result is credit supply and implicit credit demand functions, both of which are simultaneously determined. The role of risk allocation of credit through its effects on transaction costs, therefore, becomes important in incomplete and imperfect information credit markets. Accordingly, where default risk exists, with an upward sloping supply curve, lenders offer borrowers only a choice of points on the supply curve, and borrowers are restricted to these points. It is impossible to identify loan demand schedule using the observed loan amounts since these only reflect the existing supply.

Bigsten et al. (2000) estimate credit market participation and constraints faced by farmers by modeling the explicit demand for funds by firms and assessing the decision rules used by financial institutions to grant loans. Since applying for funds has transaction costs, firms can build internal funds from retained profits. They argue that controlling for risk attitudes, the factors that determine whether farmers access credit are expected return on investment, the opportunity cost of using own funds and the cost of outside funds. Given credit market imperfections, firms may prefer external funds, but would not apply due to inability to meet collateral requirements, perceived low rate of application success, and high costs associated with loan application.

Atieno, (2001) states that credit demand function can only be interpreted from the borrowers' participation decision, i.e. the decision to borrow or not, and from which sector to borrow. Such a decision will depend on, among other things, the

borrowers' economic endowment and opportunities. The credit demand schedule therefore, can be explained by empirically analyzing the factors determining access to credit.

Atieno, (1994) when estimating factors determining the demand for credit by farmers in Nakuru District found out a positive and significant relationship between non-interest costs, i.e. the costs of loan application and transportation, and the credit amount. This implies that as the costs of loan application and transportation increase, thereby raising borrowers transaction costs, it becomes uneconomical to seek small loans yet large loans are not accessible.

Nyikal, (1990) argues that farmers were aware of the existence of loan institutions. The study points out that factors such as farm income and non-farm income, farm management, limiting application procedures, collateral, consequences of loan default, high interest rates, limited funds, indebtedness and the supervision of credit are key determinants of access to credit. By using linear correlation technique, the study has limitations because it cannot effectively analyze economic factor relationships. In our study, we employ analytical logit model econometric method to establish empirically the significance of the factors determining access to credit. The method will therefore effectively analyze the economic relationships among the variables under investigation and establish the determining factor relationship.

Heyer, (1973) points out that there is need for smallholder credit policy in Kenya. Major issues of concern have been whether credit is crucial in smallholder development, should credit be provided on commercial terms or subsidized terms or both, and what institutional arrangement would be most effective. It has therefore, been argued that smallholder credit should be provided based on the prevailing macroeconomic context. Thus, commercial terms should be encouraged alongside subsidized credit and each should be limited to specific purposes. Kenya has adapted all these recommendations in one-way or another in her credit policy. It's based on this understanding that our study is motivated to investigate the determining factors

for access to credit with a view to enhance smallholder farmers participation in credit market.

Though it has been assumed that credit is a general constraint in agricultural development and specifically in Less Developing Countries (LDC's), some scholars do not content with this. Von Pischke, (1973b) observes that lack of credit may not be a major constraint and credit should be viewed in the context of many broad factors. Farmers' responses to price changes will depend on the existence of complementary interventions on the input side, since credit markets, for example, will not function well without land markets to provide collateral. Policies toward credit, fertilizer, and other inputs will be necessary adjuncts to price policies.

Aryeetey, (1996b) points out that empirical literature on credit by the rural households tends to imply that although its not obvious that demand for credit far exceeds the supply, there are significant obstacles to transform potential demand into revealed demand. Credit inaccessibility creates demand but occasionally expressed in low revealed demand. Again due to market failure in the credit market, transaction cost involved in obtaining credit is considered greater than the utility, prompting farmers to switch profits between activities as away of financing working capital. In addition, other determining factors need to be empirically examined to be able to establish the actual determinants of smallholder accessibility to the credit market.

Vasthoff, (1968) reviewed the experiences of small farm credit in Kenya by attempting to quantify the economic effect of credit on the basis of 108 farms. The study points out that credit to smallholders may yield high return on overall investment and may lead to the increase of the borrower's income.

Abuki, (1977), based on a study in Kisii District, investigated the structure of the various credit institutions with a view to analyze the lending legal regime for administration, regulation and implementation policy. The research points out that lending institutions were inadequate and insufficient.

Factors such as creditworthiness, the dominance of illiteracy and ignorance of both law and the existence of colonial laws render smallholder credit facilities inaccessible.

Musebe, (1990) based on the study in Vihiga Division of Kakamega District and using regression analysis, states that farm size bears no relationship with the supply of institutional credit. Theoretically this is not true, because farm size would influence the amount of credit demand. This is because large farms would demand more funds to finance increased farm activities being undertaken. The study established that the value of the marketed surplus is positive and statistically significant and this means that the value has a relationship with the amount of institutional credit actually obtained. Theory states that the higher the value of marketed surplus the less the amount of credit actually obtained. This is because farmers with greater marketed surplus would most likely have more own-savings compared to those with less off-farm income. Therefore, the findings of the study cannot be generalized for other areas without investigating.

## 2.1 Literature Overview

The reviewed studies reveal a wide range of factors affecting credit market performance in agriculture. The factors so far relate to the imperfect information, price of credit (interest rates), collateral (security), borrowers economic endowment, cost of credit application, transportation costs and the amount of credit available for borrowing. However, most of the studies are descriptive and therefore have no empirical basis to support the conclusions.

For most studies the issue of access to credit was not the main focus, rather it was mentioned in passing and was not analyzed in detail and some of them arrive at contradicting results and conclusions concerning credit.

Furthermore, a study by Vasthoff (1968) used a sample size of 108 farms to find out the economic effect of credit on agricultural productivity in Kenya. This study aims to study the determining attributes affecting credit accessibility by smallholder farmers



Some of the studies used correlation coefficient technique. This technique yields the degree and direction of association between variables. It does not show causal relationship between the variables and therefore fails to indicate the relative importance of the factors in explaining credit demand.

It is one of the objectives of this study to determine the relative significance of the determining factors affecting access to credit. Therefore, this study employs binary logit model in which the behaviour of farmers and credit institutions in determining credit accessibility is jointly determined.

## CHAPTER THREE

### 3.0 Methodology

#### 3.1 Introduction

This chapter presents the data type, the model, the definition of variables and the model estimation procedure.

#### 3.2 Sampling procedure and study design

The study uses primary data from farmers who borrowed from Agricultural Finance Corporation (AFC), Mumias Out Growers Company (MOCO), Mumias Out Growers Savings and Credit Cooperative society (MOSACCO) and Mumias Sugar Company (MSC) as from June 2002 to May 2003 as well as those who did not.

The study survey was carried out during the months of June 2003 on the farms in four zones of Mumias sugar scheme: Southern, Northern, Eastern and Western Zones. Smallholder farmers engaged in farming (sugarcane, maize, dairy and poultry etc.) were selected as the units of study. This motivated our fieldwork to be carried out at this time given that most farmers are planting, weeding or generally taking care of crops on their farms. The availability of these farmers enhanced our chances to collect the required data. If farmers were to be interviewed during other times especially when there is no farm work, we would have missed most of them given that most farmers usually travel to visit relatives and friends or take the produce to the market.

The data collection process involved a preliminary survey in order to construct the sampling frame and draw a sample. A pilot survey was conducted for this purpose during the first week of June. A population of 4000 smallholder farmers was identified with the help of the Kakamega (AFC) Branch Manager and the Out Grower Area Managers (MOCO and MSC) and the Manager (MOSACCO). This included both credit and non-credit users. Respondents were randomly selected from

this population in four zones randomly. Simple random sampling was used to pick subsequent respondents.

A sample size of 200 farmers was drawn. However, only 177 respondents were successfully interviewed. 200 farmers are roughly 5 percent of 4000 farmers. The author with the help of four field assistants and the field superintendents did sampling and administered the interviews.

### **3.3 Problems encountered during the field study**

Primary data collection has quite a number of difficult experiences and not all the respondents who had been sampled were interviewed. A total of 177 respondents were interviewed. There were 23 cases whose data is not recorded. We could not find 10 farmers to interview and none of the family members were present to furnish us with the information needed. About 13 farmers could not recall the information and also declined to disclose the required information to us saying that credit facilities were inaccessible.

There were heavy rains, which interrupted our data collection, and often we had to reschedule the exercise to the following day.

### **3.4 General information on the study site**

The data on which this study is based was collected from farmers in Mumias sugar scheme- Butere / Mumias District, Western Kenya.

The District covers an area of 939.3 square Kilometers. It is one of the eight Districts that form western province of Kenya. Busia and Bungoma Districts border it to the West, Siaya and Vihiga Districts to the South and Kakamega District on the North (see the maps - appendix II).

The district has a varying topography with a few hills and valleys dissected by a number of small streams. The district has an extensive undulating peneplain that

dips southwards from about 1,641M to 1,500M above sea level to a further 1,250M to the west. The lowest part of the district stands at about 1,240 M above sea level.

The district has variety of soils. Most parts of Mumias, Matungu and South Wanga Divisions have predominantly loamy soils. There are also few areas in the southern part of Matungu with black cotton soils. Butere Division on the other hand has soils ranging from sandy loam, clayloams and well-drained loam soils. Khwisero Division has predominantly shallow sandy loams that are highly eroded. The eastern parts of Khwisero have red soils. The loamy soils do support various crops such as sugarcane, pulses and cereals as is evident in Mumias, Matungu, South Wanga and parts of Butere division. The shallow sandy loams need a lot of conservation in order to support crops such as sorghum, millet and oil crops like groundnuts and sunflower. The red soils are suitable for tea growing while the black cotton soils support a number of crops, including cotton. The deep and well-developed soils in Mumias, Butere, South Wanga and Matungu division have led to farmers devoting about 68% of their arable land on cane production. The infertile soils in Khwisero division have led to poor crop development especially cash crops that generate income hence higher levels of poverty.

The District has high rainfall almost all the year round. However, the rainfall is less in intensity between December and February. The annual rainfall ranges from 1,597- 2873 mm per year. This enables farmers to have two cropping seasons District-wide.

The district has very high population density of over 546 persons per square Km according to 1999-population census. As population continues to grow the density is expected to increase to above 600 and even 700 persons per square Km by 2009, the latter very evident in Khwisero Division. High population density in Mumias Division can be attributed to its urban status and the presence of Mumias Sugar Company (MSC). There is no specific settlement pattern of the population in the district. Most people are settled on their ancestral land, which has further been subdivided into smaller unproductive units due to population growth.

The migration of people into Mumias town and Butere District headquarters has led to sprawling of slums. There are slums such as Shibale, Butere's Sophia Estate, Nubian and Mjini Estate in Mumias Town. Urban poverty is attributed to unemployment, emergence of squatters and low incomes especially among the casual workers.

The data for this study were not collected from the entire District. The smallholder outgrower farm survey covered only the four zones of Mumias Sugar Scheme, viz., Eastern, Western, Southern and Northern. These four zones are the administrative units of the Mumias Sugar Scheme. Given the objective of the study, the choice of Mumias Sugar Scheme was obvious. Mumias is the leading sugar producing company in Kenya.

Mumias sugar scheme contracted farmers access substantial a mount of credit in kind and cash from MSC, MOCO, MOSACCO and AFC. These credit facilities include funds for sugarcane production, food production and animal production. Therefore, this site is appropriate to generate adequate and useful data to analyze determinants of access to credit by smallholder sugarcane farmers.

The Scheme has over 65,000 contracted Outgrower farmers. On the basis of this size of farmers, the scheme was appropriate for the kind of study being undertaken. The third reason for the choice of MSC is that most farmers know their farm acreage very well. The fourth and most important reason is that Mumias Sugar Scheme is typical of high potential areas in Kenya where crop cultivation is the main economic activity. It was therefore thought that findings based on the data collected could be generalized to other high potential areas in Kenya

### **3.5 Mumias Sugar Company (MSC)**

The Mumias sugar scheme project was started in 1969 with sugarcane planting. In 1971, the factory started operating. The supply of sugarcane was from the factory's nucleus estates of about 3000 hectares and Outgrowers who supplied over 80

percent of the total annual requirement which have since risen to about 90 percent. MSC has installed the modern cane processing technology, the Diffuser with an installed capacity of about 10,000 tones of cane per day (tcd). It produces about 232,819 metric tones of sugar on 41,400 cane hectares of land. MSC has the capacity to effectively contribute to the national sugar demand of 600,000 metric tones if farmers can access credit.

### **3.6 Mumias Outgrowers Company (MOCO)**

Due to increased operational and outgrower services demand there emerged the need to establish a company that could handle their needs hence the formation of Mumias Outgrowers Company (MOCO) in 1975. MOCO finances cane production where the services rendered for Outgrowers are paid for by MOCO to be recovered after delivery of the crop to the factory with some interest. The credit period lasts about two years depending on the cane cycle.

The company operates two main special credit projects besides cane production.

They are:

i). Dairy animal production including Artificial Insemination services (A.I).

This project loans farmers in-calf dairy cows and gives technical advice. A farmer is allowed maximum of Kshs 50,000 to purchase a dairy cow of his/her choice and the loan amount recovered whole from cane proceeds delivered to MSC.

ii. Food production project

Cane growing was introduced in Mumias but over the years it has greatly taken up the place for food crops because land is a limiting constraint. Consequently, food security has become a threat to the socio-economic activities of the farmers.

Cane is a perennial crop that takes long between planting to harvesting before income is realized. A farmer needs money to sustain him, the family and for farm investment. This has prompted farmers to engage in illegal activities contravening the farming contract terms. MOCO has through its evaluation begun a short-term loan scheme to cane farmers to grow maize and raise food production on land that is not under cane.

The credit package includes quality maize seed, beans and fertilizer to cane farmers.

The loan has progressed as follows:

Having been an AFC-MOCO guaranteed seasonal crop credit, MOCO took full charge and started using her revolving funds growing from ceiling of below 10 million shillings to the present level of 16 million shillings and now attracts a farmer population of about 4000 compared to the original 1000 farmers. The current loan package includes certified maize seed and fertilizer at the rate of 10-Kg maize seed and 50-Kg Diamonium phosphate (D.A.P) per one acre.

Qualification for loan is based on cane age: plant crop 9 months and above and Ratoon crop 6 months and above besides being a contracted sugarcane farmer, proof of creditworthiness and land availability for growing maize and dairy farming are key determinants of qualifying for these credit facilities.

Table 3.6.1 Performance of credit demanded and distributed to farmers.

YEAR	No. of Applicants	No. of Qualifiers	Value Distributed
1997	4,729	3,513	14,771,940.00
1998	4,968	2,526	15,336,430.00
1999	5,275	4,327	16,550,122.00
2000	4,790	4,059	18,534,740.00
2001	4,168	3,342	15,498,435.00
2002	4,832	3,986	17,273,257.00
2003	4,427	3,491	16,122,000.00

Source: MOCO food project record.

Demand trends show an increasing need for the credit year to year. It attracts over 4,000 farmers yearly. Despite the trend, the impact of the project is encouraging. Yield assessment carried out over years gives an average of 20 bags per acre thus over 100,000 bags of 90 Kg are realized yearly. Mumias sugar scheme population is approximately 1.2 million with maize as a staple food with demand of over 2.4 million bags per year. This project therefore contributes about 4% of the total annual requirement of maize within the sugar scheme.

### 3.7 Agricultural Finance Corporation (AFC)

AFC was established in 1963. In 1969 the AFC was reconstituted under the agricultural finance Act (CAP 323 Laws of Kenya) with wider powers and assumed the responsibilities of the land Bank. The AFC credit performance from 1991 to 2002 is as shown in table 3.7:

Table 3.7 The (AFC) credit applied for and approved (Kshs. Millions)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Loans approved	72	86	90	69	79	20	7	1	2	123	43	0
Land purchase	57	142	106	118	55	146	91	18	7	3	4	0
Dairy Cattle	21	29	36	27	44	3	1	1	1	0	1	0
Steers	8	5	4	6	27	3	1	-	0	0	0	0
Sheep & pig	-	-	-	-	-	-	-	-	-	0	0	0
Poultry and fish	4	22	10	17	21	3	1	0	0	0	0	0
Fencing pasture	6	8	10	11	17	3	1	0	1	0	0	0
Water & irrigation	13	19	30	22	41	11	7	1	1	0	0	0
Farm Machinery	15	22	43	7	22	49	32	0	7	0	1	0
Farm Buildings	10	16	51	21	40	10	11	1	2	4	10	0
Dip,crop sprays etc	663	580	302	419	90	177	35	3	12	11	6	0
<b>* (Kshs Million)</b>	<b>797</b>	<b>844</b>	<b>591</b>	<b>648</b>	<b>356</b>	<b>405</b>	<b>180</b>	<b>25</b>	<b>32</b>	<b>19</b>	<b>22</b>	<b>0</b>

Source: Republic of Kenya, statistical abstract (2002)

Note: \*Total figure excludes land purchase, seasonal crop and smallholder credit as from 1991.

From table 3.8 loans applied for and approved shows a declining trend from 1991 to 1998. The total loan amounts approved ranges from Kshs 797 million to as low as Kshs 22 million in 2001. Therefore, from 1996 to 2002 there is a remarkable decline for credit accessible by the smallholder farmers from (AFC).

The AFC lending system has since 1992 been on the downward trend owing to a combination of severe drought and political and economic liberalization that caused the repayment rate to plummet to less than 25 percent. In response to these and recognizing that commercial banks typically have no interest in lending to rural smallholder households due to lack of viable collateral and the high transaction costs, innovative credit delivery systems and efficient credit schemes are being promoted to improve households' access to credit. Unlike commercial banks, these AFC credit programs have as their guiding principles not profit but rather accessibility and sustainability.



## 3.8 The Model

### a) Theoretical Background

The farmer's financial needs presents demand choice alternatives to the credit institutions whereby each, out of necessity, must choose at least one i.e. borrow or not borrow. However, an individual farmer cannot use a combination of them all because the individual faces utility preference for credit i.e. borrow or not borrow. Since the outcome variable in this case is not continuous but discrete, the study employs Binomial discrete choice model in analyzing the choice probabilities, which assume circumstances where subjects choose between two alternatives and must choose at least one of them Pindyck and Rubinfeld, (1976). The total choice probabilities for the access to credit for each decision taken, nonetheless, must sum to unity.

The numerical value of the outcome variable is, however, arbitrary, just a matter of convenience and therefore, not intrinsically interesting. What is of great interest is whether the classification of cases into one or another of the categories of the outcome variable can be predicted. Predicting the choice made to access credit depends, however, upon the perceived (unobserved) utility derivable from credit access. The perceived utility depends in turn on the attitudes or behavioral intent of the farmers, which are a function of the financial institutions' and individual farmer's, attributes respectively that determine access to credit, them being the predictor variables.

The study, therefore, hypothesizes that individual farmer's characteristics and financial institutions' attributes influence the probabilities of the smallholder farmers' access to credit. In other words, the utility derived from access to credit facilities is functional on the individual farmer's and institutional characteristics.

## b) The Conceptual Definitions of variables

The variables, both credit institution and individual farmer's perceived to be significant in influencing individual probabilities of selecting farm financing modes and their hypothesized relationship with credit demand are described below.

### i. Farmer's income (INCOME Y1)

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This variable is considered, as the disposable income because it can be derived from the expenditure approach to income determination if respondents are not willing to state their income. The farmers' income in Mumias Sugar Scheme can easily be derived from sugarcane payment statements. As the variable changes in absolute terms and across farmers, it is expected to influence individual farmers' probabilities of choosing to borrow or not. It is hypothesized that as income becomes larger, the farmers become wary of the risk of borrowing and may finance farming from their own income resources. It is hypothesized that as income becomes arbitrarily large, farmers become risk takers and may access credit.

### ii. Farmer's education status (EDUCATION Y2)

This is measured by whether an individual has attended formal education or not. People who are educated are expected to derive utility by choosing to borrow since they understand credit services' benefits and drawbacks. The illiterates however, suffer from this disadvantage and are risk averse hence may not access credit.

### iii. Age of cane in months (AGE Y3).

Age may also be an important variable influencing the choice probabilities. Those farmers who have young cane below the age of 9 months old for plant crop and 6 months for ratoon may prefer not to borrow. However, as the sugarcane attains 9 and 6 months for plant and ratoon crop respectively, the farmers' probabilities of borrowing increases. The young cane probably implies that the farmer has just harvested and earned some income and may not necessarily be credit constrained.

iv. Gender (GENDERY4)

This is treated as a dummy variable taking the value 1 if the individual is a male and 0 if otherwise. It is hypothesized that men are more likely to choose to borrow than women are. This could be because of the rules and regulations of financial institutions as well as those that guide property ownership, which do not favour females. For example most credit institutions in the district still require women who want to borrow first to get the approval of their spouses or fathers and also traditional norms still limit inheritance of property by women. Such requirements limit the creditworthiness of women.

v. Size of farmer's farm (FARM SIZE Y5)

This variable is defined, as the total number of acres of land a farmer owns that is under a major crop such as maize and or sugarcane as well as livestock. In this case it is expected that the larger the size, the higher the frequency and probability of borrowing to finance farming activities. They may need access to credit.

vi Interest rates on credit (INTEREST RATE X1).

Interest rates offer present measures of future values and also influence the smallholder farmers' access to credit. Farmers do not distinguish between nominal rate and real interest rates. Nominal rate of interest is the rate specified in a loan contract; the real interest rate is the nominal rate and other non-interest costs adjusted for inflation over the period of the loan. In most cases, persistent inflation has typically exceeded the nominal rates of interest paid on loans. As a result, real rates of interest are often close to zero and in many cases, negative. Policy makers are now becoming increasingly aware that the influence of real interest rates on borrowing is more important than that of nominal rates. They have also come to recognize the importance of interest rates in influencing not only the behaviour of borrowers but also that of financial intermediaries, savers and all participants in the credit markets.

Cheap credit provided below market interest rates cannot be justified on efficiency grounds. It is unlikely to serve as an incentive for farmers to use more inputs in

agriculture relative to labour costs. It is evident that availability, suitability, simplicity, dependability, convenience of programs and the continuity of credit institutions are, in general, more important than the rate of interest itself.

Interest subsidies for credit may be required and could be justified to cope with externalities. Repressed interest rates fail to fully compensate lenders for their costs. Low interest rates discourage savings, thus depriving the agricultural credit institutions' credit funds.

Rational farmers are expected to borrow from the cheapest sources. They will, therefore, choose to borrow from the credit institutions depending on the price for credit. However, during urgency, price may not matter what may count is time, i.e., which credit source avails funds in the least possible time to satisfy urgent needs. This case of access to credit and flexible terms could be more important than interest charged when urgent funding, i.e., for an opportunity with even a higher rate of return or for meeting urgent farming needs such as weeding, pesticide, harvesting, transportation and marketing.

vii. Distance from the farm to the financial institution (DISTANCE X2)

Distance from the farmer's farm to the financial institution in kilometers is considered. It is hypothesized that the nearer the financial institution then the farmer's probability to borrow increases, because the farmer saves on the scarce resources like time, energy and general transport costs. The high transport costs experienced by farmers far away from the factory affects access to credit. Thus the nearer the credit institution, the more likely for the farmers to borrow.

viii. Collateral for credit (COLLATERAL X3)

Credit institutions, particularly in the formal financial sector (FFS), demand insurance against their loan. Lending is risky and risk arises from uncertainty. Financial contracts involve, among others; credit risks, price risks, liquidity risks and systemic risk. Credit risk is the danger that the borrower will default. Price risk is the risk of loss caused by unexpected changes in prices, interest rates or exchange rates,

for example. Liquidity risk is the risk of being unable to sell the collateral quickly except at a steep discount. The risk that the default of one or more large borrowers will endanger the whole financial system is called the systemic risk.

Important transactions in the credit markets involve a relationship over a period of time between a lender and the borrower. Hence, uncertainty due to imperfect information is a major source of credit risk in credit markets. Lenders can reduce credit risk either by developing their own expertise in selection of borrowers or by relying on information from institutions such as credit clearing houses or rating agencies. Measures that increase the information available to lenders, such as the strengthening of accounting, auditing requirements and information systems improve lenders' ability to identify the borrowers with the best investment opportunities.

To cover credit risk, lenders raise the interest rate they charge on credit, to include a "risk premium". But this may be partially self-defeating, because the more creditworthy borrowers may choose not to borrow, and that would leave the lender with less creditworthy borrowers, a problem referred to as "adverse selection". Furthermore, only borrowers who take on riskier projects would normally resort to the higher cost of borrowing. Because of their limited ability to identify risks and monitor behaviour, lenders tend to require collateral and to ration credit to only creditworthy borrowers rather than to charge higher interest rates on riskier loans. Borrowers with little or no collateral are therefore likely to be affected by credit rationing.

The rural smallholder farming is subject to greater probability of covariance risks. For example, due to weather fluctuations, commodity price variations affect whole groups of farmers, making it difficult for members of the group to repay the loans, particularly when the lending is highly correlated through area concentration or credits related to particular commodity. This situation arises when the attributes of borrowers are unknown to lenders. Lenders tend to be very cautious in credit policies if not cognizant of the borrowers' circumstances, activities and characteristics. The adverse selection problem is characterized as individuals having

different perceptions of the riskness of their projects. If the interest rates were to be raised to counter the possibility of credit defaults, it is precisely those borrowers with lower risks who will cease to borrow first. Individuals most likely to repay their credit are put off by the high interest rates. Those who would be inclined not to repay their credit would not care about the high interest rates stipulated. "Moral hazard" is the possibility that borrowers will relax the efforts that they put into making the project successful or the type of project that they undertake, thereby increasing the risk. Riskier projects are those that would seek financing at higher rates of interest and they are less likely to lead to loan repayment. A higher rate of interest may therefore, have self-defeating effects on borrowing, recoveries as well as on profits.

Lenders however, try to manage credit risks by advance assessment, continuous monitoring, and providing for such a situation in different ways. Credit risk can be reduced to a certain degree through avoidance, portfolio diversification, transference sharing and through guarantees of different types, including credit repayment reserve funds. In addition, lenders could improve the availability and quality of information about borrowers, the design and enforcement of loan contracts and enlarge the range of instruments so as to permit greater diversification of portfolios. Inherent risks cannot usually be eliminated altogether, but the choice of adjustable or fixed interest rates, equity participation, and collateral or cosigner requirements are all examples of different risk assignment.

Lack of collateral, which is usually valuable assets like land, permanent houses, vehicles, sugarcane, livestock, etc., disqualifies many borrowers from accessing credit. The rationale for demanding collateral especially for credit institutions is that it reduces both the volume of information required and the costs of gathering it. Since it reduces the lender's loss to zero in case of default. Placing less emphasis on collateral and more on borrowers information will enable credit institutions to serve large number of farmers. The variable is expected to significantly influence individual farmer's choice to borrow. Nevertheless, it is treated as a dummy variable because of the inherent difficulties of valuing different types of collateral. Thus collateral=1 when sugarcane is demanded as collateral and 0 otherwise.

ix. Time required to process credit (TIME X4).

Time is a scarce and very useful resource for which rational individuals always seek to maximize its use. Time in this case is measured in terms of days taken to process a farmer's credit application and possible funding. Where, therefore the acquisition of credit becomes bureaucratic, it acts as a disincentive to access credit. Borrowers will tend to avoid this bureaucracy by borrowing from less time wasting sources that process credit applications fast.

x. Account requirement (ACCOUNT X5)

Most financial institutions demand farmers to open an account with them or with a bank in order to borrow or be a member. MSC, MOCO, MOSACCO and AFC all require farmers to have account holdings in order to be eligible for credit from them. If the amount for opening an account is beyond the reach of some farmers, then they are automatically disqualified to borrow. This is a common requirement by credit institutions in Kenya where the minimum amount to open an account has been increasing over years. This phenomenon may have the effect of pushing farmers away from the credit market. When this too becomes an obstacle, farmers resort to self-financing or stop completely to borrow. It is a dummy variable with 1=for account required and 0=account not required.

xi. Credit repayment method (REPAYMENT METHODX6)

Rural smallholder borrowers do not reckon the cost or burden of borrowing by reference to nominal or effective rates of interest payable to the lender. Focusing on debt service installments in absolute terms is more meaningful from the point of view of the rural smallholder farmer than the rate of interest applied to the credit. The installment burden is what would often weigh in one's mind as "cost" when deciding whether or not to borrow.

Credit institutions require that farmers pay the credit amount in lump sum or in installments. These approaches to credit recovery can influence favourably or adversely the choice to borrow. This variable is treated as a dummy, where lump sum =1 or instalments = 0

xii. Restrictions on credit use (RESTRICTION X7)

Some lending institutions, especially formal financial sector institutions, are particular about the usage of credit they provide. But some borrowers find it difficult to stick to such credit contracts and, therefore, fail to qualify for them having dishonoured this requirement in the past. At the same time being engaged in an economic activity not financed by the institution denies would be borrowers access to credit. Most farmers, especially smallholders, do not engage in the same activity all the year round due to changing market conditions that makes some activities more profitable than others and need to switch their farming activities accordingly. Credit with restrictions will therefore not suit their farming circumstances. The variable will be treated as a dummy with restriction = 1 if imposed and 0 if otherwise.

xiii. Credit repayment period (REPAYMENT PERIOD X8)

Normally, borrowers would prefer to repay loans over along period of time via smaller amounts. This is because loans recovered over shorter periods put a lot of financial strain on their incomes. However, credit with very high interest rates, tend to be lend for very long periods in order to ease interest burden on borrowers. A short period of repayment of large amounts at very high interest rates would put a greater financial burden on borrowers. Repayment period will be measured by the number of months it takes to pay back the loan.

xiv. Credit amount (AMOUNT X9)

Most farmers credit institutions lend small amounts of credit because their lending capacity depends on their surplus credit funds. On the other hand, farmers argue that they do not earn enough revenue by borrowing small amount of credit. Thus availability of an institution that lends funds according to the needs of the farmer is likely to influence the demand for credit. Thus the availability of the desired credit amount is likely to influence access to credit by farmers

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c) **Theoretical model specification.**

The Binomial logistic regression or logistic model of choices to borrow or not to borrow by the smallholder farmers is developed on the axiom of utility maximization. This is based on the possible access to credit sources by farmers that offer them the highest utility.

Given this rationality assumption, a representative farmer *i* faced with the problem of making a discrete choice amongst *j* alternatives can be described using the utility function given below:

$$U_{ij} = U_{ij}(X_{ij}, Y_i) + \varepsilon_{ij} \dots\dots\dots (1)$$

Where

$U_{ij}$  = the determinate component of the Utility that individual farmer *i* expect to derive by using credit source *j*.

$X_{ij}$  = a vector of observations on variables that are attributes of credit institutions, i.e., *j* faced by the individual farmer *i*.

$Y_i$  = a vector of observations on variables that are attributes of individual farmer *i*, faced by *j* alternative credit sources.

$\varepsilon_{ij}$  = disturbance term capturing a vector of unknown parameters, intrinsically random Choice behaviour and errors that individual *i* makes as he chooses between two sources available.

If the farmer prefers source *j* to *k*, then

$$U_{ij} > U_{ik} = U_{ij}(X_{ij}, Y_i) + \varepsilon_{ij} > U_{ik}(X_{ik}, Y_i) + \varepsilon_{ik} \text{ and by arrangement}$$

$$U_{ij}(X_{ij}, Y_i) - U_{ik}(X_{ik}, Y_i) > \varepsilon_{ik} - \varepsilon_{ij} \dots\dots\dots (2)$$

Assuming  $U_{ij}$  above is linear, inequality (2) can be expressed in a generalized form as,

$$U_{ij} = \alpha_0 + \alpha_1 Z_{1i} + \dots\dots\dots + \alpha_n Z_{ni} + \varepsilon_{ij} \dots\dots\dots (3)$$

Where,  $Z_{1j}, \dots, Z_{nj}$  are the transformations of both the credit institutions and individual farmer attributes.

For convenience, this generalized utility model can be expressed in vector notation as,

$$U_{ij} = Z_{ij}\alpha + \varepsilon_{ij} \dots \dots \dots (4)$$

And from preference inequality (2), if  $\varepsilon_{ij}$  can be considered normally distributed, then so can their differences. Thus, substituting (4) into (2) we obtain inequality (5),

$$U_{ij}(X_{ij}, Y_i) - U_{ik}(X_{ik}, Y_i) > n_i \dots \dots \dots (5)$$

Where  $n_i = \varepsilon_{ik} - \varepsilon_{ij}$

Substituting from the generalized utility model we obtain inequality (6)

$$Z_{ij}\alpha - Z_{ik} > n_i \text{ or } (Z_{ij} - Z_{ik})\alpha > n_i \dots \dots \dots (6)$$

With the assumed normality of  $n_i$ , it is noted that the probability of a farmer accessing  $j$  i.e., borrowing, being chosen is represented by accumulative normal probability density function. But modeling selection probabilities along these lines makes econometric estimation with the normal stochastic specification complex. To simplify this econometric problem, the study adopts an alternative approach that assumes Weibull distribution of the error term Maddala, G.S., (1983). The difference between any two random variables with this distribution has a logistic distribution function yielding the linear logistic regression or linear logit model.

Therefore, if farmer  $i$  prefer source  $j$  (borrowing) to source  $k$  (not borrowing) then the choice probability that the particular source will be accessed and chosen is

$$P_{ij} = \text{Pr ob}(Z_{ij}\alpha + \varepsilon_{ij} > Z_{ik}\alpha + \varepsilon_{ik}) \dots \dots \dots (7)$$

This probability can be given as the utility of the preferred source to finance farm investment i.e., source  $j$  weighted by the total utility of the two sources as shown in equation (8):

$$P_{ij} = \frac{e^{Z_{ij}\alpha}}{e^{Z_{ij}\alpha} + e^{Z_{ik}\alpha}} \dots \dots \dots (8)$$

This is the dichotomous logistic regression or binary logit formulation of an individual farmer's choice problem involving two competing alternatives of borrowing or not borrowing.

**d) Estimation model specification**

The specific form of the logistic regression model to be used is given as follows,

$$P(M_j) = \frac{e^{\alpha_0 + \alpha_1 X_1 + \dots + \alpha_k X_k}}{1 + e^{\alpha_0 + \alpha_1 X_1 + \dots + \alpha_k X_k}} \dots\dots\dots (9)$$

Where  $P(M_j)$  is the probability that a farmer will access credit or not.

However, the odds that source j (borrowing) will be chosen say over source k (not borrowing) is given as,

$$\frac{P(M_j)}{P(M_k)} = \frac{P(M_j)}{P[1 - P(M_j)]} = e^{\alpha_0 + \alpha_1 X_1 + \dots + \alpha_k X_k} \dots\dots (10)$$

i.e.,  $P(M_k) = P[1 - P(M_j)]$ , Where the outcome variable is dichotomous.

Taking natural logarithm of both sides of equation (10)

$$\ln \left\{ \frac{P(M_j)}{P[1 - P(M_j)]} \right\} = \alpha_0 + \alpha_1 X_1 + \dots + \alpha_k X_k \dots\dots\dots (11)$$

Where  $\ln \left\{ \frac{P(M_j)}{P[1 - P(M_j)]} \right\}$  called the logit, is the log of the odds that farm source j (borrowing) is chosen rather than k

This can now be written as,

$$\text{logit}(M) = \alpha_0 + \alpha_1 X_1 + \dots + \alpha_k X_k \dots\dots\dots(12)$$

The logit transformation is important to the study of logistic regression because logit  $M = \pm\infty$  ensures that the probabilities estimated for the probability forms of the equations 9 and 10 will be greater than 0 and less than 1. Besides, it has many of the desirable properties of a linear regression model, e.g., it is linear in its parameters, may be continuous, etc. However, its parameters are estimated by

Maximum Likelihood Estimates (MLE) techniques. The method, computes values of the unknown parameters that maximize the probability of obtaining the observed values of the outcome variable.

It is used to maximize the value of the log-likelihood function Menard, S., (1995) which shows how likely it is to obtain the observed values of the outcome variable, given the values of the explanatory variables and the estimated parameter coefficients. The process of obtaining the solution is iterative, i.e. of repeated estimations until the change in the log-likelihood function becomes negligible and is said to converge.

The logit model involving the choice of smallholder farm financing source can, therefore, be specified as;  $M = \alpha_i Z_i + \varepsilon_i$ ,

$$\text{Where } \alpha_i Z_i + \varepsilon_i > 0$$

In linear form this can be written as,  $M = \alpha_0 + \alpha_i Z_i + \varepsilon_i$ ,

Where M = discrete dependent variable represented access to credit (borrow or not borrow).

$Z_i = (X_i, Y_i)$  as the vector of credit institutional and individual farmer explanatory variables.

$\alpha_i$  = the parameter to be estimated showing the probability that the farmer will access credit financing mode M will be chosen or not.

$\varepsilon_i$  = disturbance term.

Its functional relationship is given as  $M = f(X_i, Y_j)$

Where,  $X_i$  = explanatory credit institution variables affecting access to credit.

$Y_j$  = explanatory individual farmers' variables affecting access to credit.

The function therefore estimates the probability that access to credit M, i.e., borrowing or not, given the predictor institutional and individual farmer's variables will be chosen.

### e) Diagnostic Tests

#### Multicollinearity test.

This test is performed so as to avoid structural parameter estimation problems and reversing of signs. Using Frisch's 'Confluence Analysis' (or Bunch-map Analysis) where we regress the dependent variable on each one of the explanatory variables separately, and by examining their effects on the individual coefficients, standard errors and on the overall  $R^2$ , we had to conclude that multicollinearity was not a serious problem.

#### Heteroscedasticity Test.

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Logit robust data estimation was performed to control for Heteroscedasticity. Thus by the use of robust logit regression results, there is no effect of Heteroscedasticity.

## CHAPTER FOUR

### 4.0 Findings of the study

This chapter examines the determinants of borrowing by smallholder farmers and it is divided into two sections.

### 4.1 Section one: Descriptive Data Analysis

#### i) Borrowing conditions-lenders Requirements

Farmers are expected by most credit institutions to fulfill certain conditions to qualify for credit. They are required to be members, account holders, be contracted farmers to (MSC) as is indicated by 85.9 percent of the sampled farmers. (Table 4.1.1 below). Most of them 67.5 percent hold membership and accounts or have minimum account deposits in their accounts but 32.5 percent said this was not a requirement (see table 4.1.1 below).

Table 4.1.1:General Borrowing conditions

Membership requirement			Minimum deposit/account /contract requirement	
	Frequency	%	Frequency	%
Yes	152	85.9	120	67.5
No	25	14.1	57	32.5
n =177			n =177	

The requirements provide important appraisal information for credit institutions useful in reducing credit risks and curbing losses that may result from default because the majority of smallholder farmers lack collateral to secure credit. For smallholder farmers who are uncreditworthy based on collateral requirements and links to the credit institutions, this condition may deter them from borrowing. From Table 4.1.1 below, only 26.7 percent of farmers who were interviewed said collateral was an important requirement for credit, 73.3 percent said it was not a major requirement for one to borrow.

Table 4.1.2:Collateral requirement

Response	Frequency	percent
Yes	47	26.7
No	130	73.3
Total	177	100.0

However, different observations are recorded when the different types of collateral are considered. Credit institutions require different types of collateral as shown in table 4.1.3 below.

**Table 4.1.3: Types of collateral demanded**

Collateral demanded	Frequency	%
Sugarcane	122	68.9
Guarantors(group)	19	10.7
Share certificates	36	20.3

It is clear from the table that the kind of collateral such as sugarcane and group guarantors are the most required by credit institutions totaling 79.7 percent against 20.3 percent of share certificates requirement. Most farmers without these kind of collateral are not proscribed in the credit program's target group.

ii.) **Borrowing conditions –Borrowers Requirements**

Smallholder farmers demand certain types of credit. They demand quick credit as the results of table 4.1.4 below indicate. The 28.2 percent, according to the survey results, demand credit that take a week to process and 66 percent take fortnight to process. Credit applications not processed in a fortnight get processed at all in the third week as only a negligible 3.2 percent get processed. They however get processed in the fourth week where a reasonable number 20.5 percent get approved. Nevertheless, almost of all the credit to smallholder farmers, about 90 percent take at most a month to process. Thus to be able to exploit the market and increase access to credit, credit institutions have to avoid bureaucracy in their credit approval procedures.

**Table 4.1.4: Days it takes to process credit**

Number of days	frequency	%	Cumulative %
1-7	50	28.2	28.2
8-14	44	24.9	53.1
15-21	24	13.6	66.7
22-28	6	3.4	70.1
29-35	30	16.9	87.0
Above 35	23	13.0	100.0
Total	177	100.0	

According to the sample results of table 4.1.5 below, the Smallholder farmers demand credit that is not restricted to particular agricultural activity and from the study, 86.7 percent of the respondents said that restrictions on credit applications was a requirement for borrowing but affected their access to credit so much. Therefore, lending unrestricted credit could increase credit demand. The 13.3 percent of those who responded by saying that credit was restricted but did not affect their credit demand were those engaged in sugarcane and maize farming only.

Table 4.1.5: Response on restrictions on credit use

Response	Frequency	Percent
Yes	154	86.7
No	23	13.3
Total	177	100.0

From the foregoing discussion, it emerges that credit in smallholder sugarcane farming generally entail the fulfillment of a number of institutional and individual farmer's requirements. In summary, for farmers to access credit facilities they are required to satisfy the following:

- They are pegged on being a contract farmer to (MSC), having an account and being a member to the credit institution.
- They are issued against security such as sugarcane, forms of guarantee, e.g. group guarantee.
- They are issued without grace periods, implying
- That credit repayment commences immediately after the elapse of the first repayment period
- The credit amounts provided are small, and hardly exceed Kshs 40,000.
- Most of the credit services are restricted to specific agricultural activities such as sugarcane, maize, dairy and poultry.



Table 4.1.6. Descriptive Data Analysis

<u>Variable</u>	<u>Mean</u>	<u>Std.Dev</u>	<u>Min.</u>	<u>Max.</u>
Income	46662.74	38539.55	3186.5	200,605.5
Age of cane	12.43	4.82	6.0	25.0
Farm size	0.84	0.73	0.8	6.0
Interest rate	19.19	4.10	7.5	23.0
Distance	5.24	12.27	1.0	40.0
Time to process	21.11	8.53	4.0	62.0
Repayment period	19.60	2.40	16.0	26.0
Credit amount	13937.85	7603.20	0.0	40,000.0

Table 4.1.6 above shows that farmers on average earn Ksh.46, 662.70 from sugarcane per crop cycle harvested at an average age of 19.60 months. The farmer's farm size on average is 0.84 hectares, and this is a limiting constraint on sugarcane and any other crops that require large farms because mechanization cannot be optimally used. Average age of the sugarcane when applying for credit was 12.43 months. Interest rates are 19.19 percent on average. The rates of interest are high compared to the rates charged by the Rural Outreach Programme and Kenya Rural Enterprise Programme (ROP and K-REP) credit institutions. The average distance from the farm to the financial institutions is 25.24km. Time to process credit and the repayment period averages 21.11days and 19.60 months respectively. The credit amount available for farmers averages Kshs 13,937.85, yet the maximum amount of credit available for lending is Kshs 40,000.00. Per year.

Farmer's income levels range from Kshs 3,186.50 to Kshs 200,605.50. The interest rates ranges from 7.5 to 23 percent, age of sugarcane when applying for credit is 6 to 25 months, distance from the farm to the financial institutions is between 1 to 40km, time to process credit 4 to 62 days, farm size 0.8 to 6 Ha, repayment period 16 to 25 months and credit amount available for borrowing ranges from Kshs 0 to 40,000.

## 4.2 Section two: Regression data analysis

The institutional and individual farmers' lending policies, terms and conditions that determine access to credit that is the choice to borrow or not are analyzed in this section. We determine the direction, magnitude and significance of their effects on access to credit.

The institutional factors examined in this study that significantly determine access to credit and the choice to borrow or not are credit amount, restrictions on credit use, requirement to hold an account with a bank, repayment method and time taken to process credit.

On the other hand, individual farmer's education status and farm size are important factors in determining this choice. From the sample, a total of 177 respondent cases were included in the analysis. The results, nevertheless, show that the explanatory variables included in the model, i.e., the attributes of the financial institutions and those of the farmers yield better predictions of the explained variable, i.e., choosing to borrow or not. In other words, the explanatory variables influence Smallholder credit demand choices.

The statistic test for the combined effects of the independent variables in the model, i.e., the Wald chi-square statistic {Model Wald  $\chi^2 = 50.16$ }, is statistically significant when compared with the {Prob >  $\chi^2 = 0.000$ } implying that the variable coefficients are different from zero. There also exists a relationship between the explanatory variables and the explained variable that cannot be attributed to chance. The  $R^2$  statistic tests for the overall significance of the variable relationship. Empirical research experience has shown that its maximum value of one is hardly achieved and that in general, a pseudo- $R^2$  above 20 percent indicates a strong relationship between the independent and dependent variables. In this case it is in excess of 20 percent, i.e., 77.9 percent indicating a strong relationship. Thus there is sufficient evidence to be confident that changes in the attributes of the financial institutions and those of the farmers strongly influence the probabilities of choosing to borrow.

**Table 4.2 Maximum Likelihood Parameter Estimates**

<u>Variables</u>	<u>coefficient</u>	<u>Z</u>
Constant term	-8.00910	-1.640
Income	-1.08e <sup>-07</sup>	-0.009
Education	-1.31368 <sup>***</sup>	-1.703
Age of cane	0.17775	1.292
Gender	2.53759	1.485
Farm size	2.53570 <sup>**</sup>	2.262
Interest Rate	-0.03080	0.280
Distance	-0.06116	-0.823
Collateral	-0.74718	-1.064
Time to process credit	-0.22320 <sup>*</sup>	3.343
Account requirement	-5.06096 <sup>**</sup>	-2.180
Repayment method	-6.66439 <sup>*</sup>	-2.780
Restrictions	2.08625 <sup>*</sup>	2.595
Repayment period	0.37605	1.430
Credit amount	0.00074 <sup>*</sup>	3.847

Wald chi2 (14)=50.16

Log likelihood=-10.81 Pseudo R<sup>2</sup>= 0.7792

Where, (\*\*\*) Variable significant at 10% level

(\*\*) Variable significant at 5% level

(\*) Variable significant at 1% level

According to the results therefore, the amount of credit borrowed, restrictions on credit use and repayment method which are statistically significant at 1 percent level, requirement for a farmer to have bank account and farm size are significant at 5 percent level. The results of parameter estimates, however, establish the magnitude and direction of influence for each variable. Thus they are included in the model to determine the level of significance, magnitude and the direction of their individual effects.

The coefficient of the requirement to guarantee collateral or security has the anticipated negative sign. Thus when collateral is required as security for credit, the farmer without collateral is unlikely to borrow to finance farm activities.

Restriction on credit use is an important factor influencing access to credit. It has positive coefficient and highly significant at 1 percent level, this implies that farmers probability to access credit is high when credit is restricted to specific farming activity. However, farmers who are not targeted and would wish to initiate farming activities different from the ones specified are unlikely to access credit.

The coefficient of the amount of credit borrowed has the expected positive sign and it is statistically different from zero at the 1 percent level. It is instructive that as the amount of credit increases, the likelihood of farmer's accessibility to credit increases. This implies that large credit amounts determine the farmer's access to credit. Thus small credit amounts are a disincentive to access credit.

The time to process credit has a negative sign and it is highly significant at 1 percent level. It indicates that the less the number of days it takes to process credit, the more likely that a farmer will demand credit. In other words it implies that farmers demand credit that is less bureaucratic and easier to access.

Education status has a negative sign and it is statistically significant at 10 percent level. The education status significantly influences the Smallholder farmers' likelihood to access credit. The educated farmers have low probability to access credit to finance farm investments because the credit institutions regard them not to be credit constraint.

The parameter estimate for the requirement that a farmer should hold an account to be able to borrow has negative sign and is statistically significant at 5 percent level. The variable therefore, significantly determines the farmer's probability to access credit. The account requirement decreases the likelihood that the smallholder farmers will access credit. Some farmers don't even have the minimum amount to open an account thus this requirement makes it hard to access credit.

The coefficient of farm size is positive and statistically significant at the 5 percent level. Farm size, significantly affect the probability to access credit. The positive sign

implies that the likelihood of smallholder farmers' accessibility to credit increases with the size of the farm. Thus farmers with large farm size are more likely to access credit because their investment needs are high. Also large farm size provide adequate collateral for credit.

Income has a negative relationship on the probability to access credit. This negative sign indicates that the probability of smallholder farmers accessing credit decreases with increasing income levels. The probability to access credit by farmers whose incomes are high, is low because the credit institutions assume that they can finance farm investments from their internal sources of income.

Distance, gender, interest rate, age of the sugarcane, repayment period and collateral, are insignificant explanatory variables determining farmers accessibility to credit according to the study. Distance does not influence the probability to access credit because most of the financing institutions are all within the reach of farmers. Gender does not significantly affect access to credit by farmers. Most farmers jointly carry out their farming activities, the couple jointly signs for the farm credit transactions. Interest rates by AFC, MSC, MOCO and MOSACCO affect the access to credit because it serves as a measure of the price of credit. Repayment method does not influence the likelihood for a farmer to access credit because most farmers don't evaluate its impact on the cost, quality and accessibility of credit. Collateral or security for credit does not significantly influence access to credit because most farmers grow sugarcane, which is the traditional collateral demanded by the four credit institutions for one to get credit.

Two explanations may emerge from this scenario. Firstly, the credit rationing behaviour by lenders, inadequate credit facilities and lack of information hinder the credit market from making credit accessible. Secondly, lack of credit, due to an inadequate credit market, means that credit institutions and smallholder farmer characteristics determines credit accessibility to farmers.

## CHAPTER FIVE

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### Summary

The study examines the relationship of the smallholder farmer characteristics and formal credit institutions' lending policies in determining access to credit. The financial institutions in the scheme are far from making credit accessible to the farmers.

When credit access is viewed in terms of the rationing behaviour of formal credit institution, the study finds that 90.96 percent of the sampled farmers are credit constrained. Evidence of credit rationing is observed in the credit market, as indicated by the significant difference between the minimum amount received and the maximum amount applied for.

Several factors determining access to credit according to the dichotomous logistic regression analysis include the farmers' education status, size of the farm, the size of loan demanded, time to process a loan, requirement to have bank account and restrictions on credit use are significant determinants.

The demand for collateral (security) in form of sugar cane is a factor common in most financial institutions in the study area. The probability to access credit decreases with the increase in the number of days it takes to process a loan. This implies that the short period it takes to process a loan increases the likelihood for a farmer to access credit.

Loans that are restricted as to purpose of use are characteristic to AFC, MSC, MOCO and MOSACCO. Most farmers don't need credit whose terms are restricted to a given activity whose earnings are low and take long to be realized even when more profitable ones have emerged. Just as one farmer in Mumias commented, "I do not invest in the same farming activity all year round. Today its maize, tomorrow poultry and the next day may be dairy, depending on their returns besides the core activity of sugarcane farming."

## 1 Conclusions

There's co-existence of the credit institutions in the sugar scheme, especially in serving Smallholder out grower cane farmers' financial needs. The kinds of credit farmers require include funds for sugarcane production, dairy development and food production.

The attributes studied are important in determining access to credit and significantly influence the accessibility to credit institutions that offer the services. The study established that the likelihood to access credit decreases with distance from the credit institutions, collateral requirements, education status, account requirement and repayment method.

We further argue that the fact that those who did not seek credit because they had relatively higher income may not necessarily mean that they did not need credit. Rather, it may mean that the type of credit they require do not exist, implying that the credit market does not serve the needs of farmers seeking to diversify their farming activities. The result is, therefore, a credit demand gap capturing those farmers not served by credit institutions.

A number of conclusions can be drawn from the results of this study. One major conclusion is that the large number of potential borrowers who did not seek credit does not mean that they did not need credit. This result suggests that lack of supply create a lack of demand, displayed in the low revealed demand. This has resulted in credit rationing by credit institutions and the creation of credit gap in the market. Hence, although these farmers need credit, the lending terms and conditions hinder them to access credit.

An important conclusion for improving access to credit that emerges from this study is that given the wide and established branch network of commercial banks, improving their lending terms and conditions in favour of smallholder farmers would significantly increase accessibility to credit.

## 5.2 Policy Implications

Quantifying the impact of determinants of access to credit on smallholder 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. Second, it establishes the relative importance of the various determinants that affect smallholder farmers access to credit.

Given that there exist a number of credit institutions, there is need for a policy measure to improve accessibility of smallholder farmers to formal credit services. This can be achieved through the establishment of credit schemes that targets the needs of the smallholder farmers.

The formal financial institutions should also be encouraged to diversify their credit portfolios so as to be able to cater for the different financial needs of the smallholder farmers.

There is need to review the credit institutions' lending terms and conditions with a view to making them enhance the smallholder accessibility to credit. Firstly, the time to process credit should be reviewed to reduce the period farmers wait before receiving credit applied for. Secondly, the credit institutions minimum amount to operate an account should be reduced to enable many farmers to operate savings accounts. This will enable them qualify for credit services. Furthermore, there is need to increase the credit amount available for lending. Most farmers who need large amounts of credit are denied because credit institutions rationing behaviour. Small amounts of credit usually serve as a disincentive to borrow.



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# Appendix I: Questionnaire

Respondent No.....

Introduction:

I am a student at the University of Nairobi carrying out a research on how farmers access credit in Butere/ Mumias district. My major concern is to find out how farmers in this area access credit facilities, the requirements to be able to borrow and how they use the credit extended to them. I will therefore kindly request you to give me answers to the questions I will ask on this subject to the best of your ability. I would like to assure you that every information you give me would be treated with strict confidentiality.

Interview schedule

## SECTION I. HOUSEHOLD INFORMATION.

H1. Interviewer: Please indicate the Zone of resident for the farmer:

Northern Zone

Southern Zone

Western Zone

Eastern Zone

H2. Interviewer: please indicate Gender of the farmer: 1. Male 0. Female

H3. How old are you? .....

H4. Did you ever go to school? (a) Yes (b) No

H5. Have you ever attended other courses or training of any kind? (a) Yes (b) No

If Yes, where did you attend and what courses did you undertake?

H6. Do you have people who live with you? (a) Yes (b) No

If Yes, how many live with you? .....

H7. Do they depend on you or they support themselves?

Depend on me ..... Support themselves.....

H8. Are any of your children in school? (a) Yes (b) No

If Yes, tell me the type of school, college or university they attend and the fees you paid last year?

H9. How of your earnings do you contribute to household expenditure?

- (1) All,
- (2) Part
- (3) Nothing

H10. Please indicate your household expenditure under the following items as applicable.

<u>Item</u>	<u>expenditure (Kshs)</u>
-------------	---------------------------

Farm tools

Labour

Foodstuff

School fees

Transport

Clothing

Rent

Other, please specify.

Total

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SECTION II. FARMER'S SOURCES OF INCOME DATA

F11. (a) Please indicate the size of your farm in acres.....

(b) How many acres are under crop cultivation?.....

F12. (a) What cash crop(s) do you grow?

<u>Cash crop</u>	<u>acreage</u>
------------------	----------------

1.

2.

3.

(b) What food crops do you grow?

<u>Food crop</u>	<u>acreage</u>
------------------	----------------

1.

2.

3.

F13. Besides this cash and food crops do you have any other farm activity?

(a) Yes (b) No

If Yes, please specify the activity.....

F14. What is then your major source of income?.....

F15. Indicate how much you earned from the crops and other farming activity.

Crops \_\_\_\_\_ amount (Kshs)

Sugarcane

Maize

Other specify

F16. (a) Are you currently employed for a wage? (a) Yes (b) No

If Yes, go to question F17.

(b) If No, have you ever had a salaried job? (a) Yes (b) No

If Yes, what type of job? Probe (clerk, teacher, carpenter) etc.....

(c) What was your salary when you left the job? Kshs.....

F17. (a) Who is your employer?.....

(b) In which range does your monthly salary fall?

1. Kshs 0 to 3,999
2. Kshs 4,000 to 8,999
3. Kshs 9,000 to 13,999
4. Kshs 14,000 to 18,999
5. Kshs 19,000 and above

(c) Do you have other sources of income apart from the ones mentioned above, probe (Chair making, weaving, pottery, livestock, trade, etc) if so, what are they?.....

F18. What would you say your income from these other sources:

Between;

Kshs 500 and 1,000

Kshs 1,001 and 2,000

Kshs 2,001 and 4,000

Kshs 4,001 and 8,000

Kshs over 10,000

SECTION III. FARMER'S SOURCES OF CREDIT

F19. (a) How much money did you have to start your farming activity?  
Kshs.....

(b) How did you find the money?

Personal savings/ retirement benefits.....

Λ grant from friend(s), relatives, neighbours, landlord.....

Λ cooperative loan

Bank loan

Loan from NGO

Λ loan in the form of commodities from a shopkeeper(s)

Loan from a moneylender

Loan from the Λgricultural Finance Corporation (AFC)

Other, please specify

(b) What was the interest rate on main source of money?.....%.

F20. How far is the loaning institution from your farm? Km.....

F21. To obtain the loan how much did you spend on;

Item	Kshs
Public transport	
Application fee	
Other, specify	

F22. Did you provide collateral (security) for the loan? (a) Yes (b) No

If Yes, in F20, what collateral did you provide?

Λ piece of land

Λ permanent house

Λ vehicle

Proof of a job

Λ guarantor

Share certificate(s)

Household valuables (bicycles, T.Vs, Radios, etc)

Λ verbal promise to pay

Past clean repayment record

Other, specify

F23. Why did you borrow from these sources

0. No collateral demanded
1. No interest charged on loans
2. Low interest charged on loans
3. Immediate loans without bureaucracy
4. Can obtain total amount of loan required
5. Member of the institution
6. Friendly attitude
7. Flexibility on loan repayment
8. It is near to my home and farm site
9. The lender was reciprocating for my earlier loan
10. Can borrow against my savings
11. Others please specify.

F24. Have you ever borrowed money from bank? (a) Yes (b) No

If Yes, how much did you borrow then? Amount Kshs.....

F25. If No, why have you never borrowed money from a bank?

0. Lack of required collateral
1. Banks only give big loans
2. Banks take long to give a loan
3. Bank staff are impolite
4. I don't understand how banks work
5. Banks belong to the rich
6. Others, please specify.

F26. Do you have a bank account? (a) Yes (b) No

If Yes, which account?

Savings account

Current account

Fixed deposit

Other, please specify

F27. Are you required to maintain a minimum balance in your account?

(a) Yes (b) No

If Yes, how much is the minimum balance? Kshs.....



F28. If No in F27, why do you not have a bank account?

Minimum balance is too high

Bank deposit interest rate on savings is too low

My income is low and irregular to keep in a bank

Opening a bank account is too involving (e.g., letter from an employer, a guarantor, etc.)

Banks operate when I am busy to go there

I cannot get money readily when I urgently need to use it

Banks refuse to give me a loan so I cannot bank with them.

Others please specify.

F29. Did the institution put restrictions on the use of the loan? a) Yes b) No

If Yes in F29, please specify the restrictions

Loan must be used for the purpose for which it was borrowed

Loan must be used as per the specified goal(s) of the lending institution

Loan must be used in phases with the balance kept by the lender

Other, please specify.

F30. Did you pay the loan on time? (a) Yes (b) No

If No in F30, why did you not repay the loan on time?

Crop loss

Domestic problem

Inadequate funds

I never understood the loans terms

Others, please specify

F31. What action did the lender take against you?

Extended the repayment period for me

Seized the security I offered

Legal action

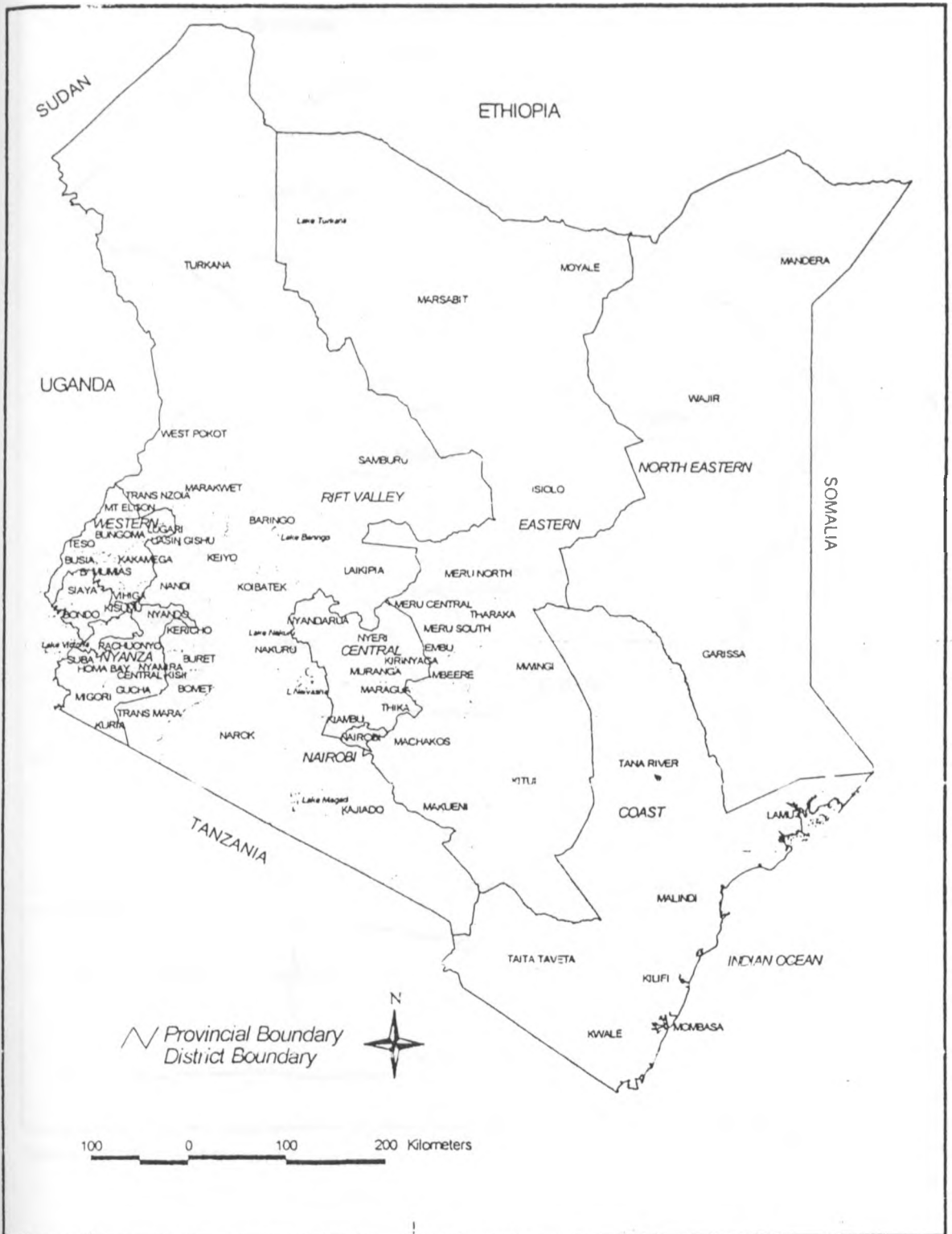
Others, please specify.

Thank you so much.

# Appendix II:

# Maps

## Location of Butere/Mumias in Kenya



# Butere/Mumias District (study site)



Prepared by CBS 1996 Population Census

This map is not an authority over administrative boundaries