RURAL LIVELIHOODS AND HOUSEHOLDS' PARTICIPATION IN FINANCIAL MARKETS: THE CASE OF SMALLHOLDERS IN KAKAMEGA AND VIHIGA DISTRICTS

BY

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS OF SCIENCE DEGREE IN AGRICULTURAL ECONOMICS, UNIVERSITY OF NAIROBI

AUGUST 2006

DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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DEDICATION

To my parents, Margaret and Zephaniah Odumbe, who worked hard to make this world a better place for my siblings and I!

ACKNOWLEDGEMENTS

I wish to thank my supervisors Professor C. Ackello-Ogutu and Professor W. Oluoch-Kosura for the support and guidance that they offered in the course of this study. I am further grateful for the support and encouragement that I received from Dr. Rose Nyikal, the Chairman, and other members (both staff and students) of the Department of Agricultural Economics. Special thanks to Mr. Cyrus Njoka and Ms Rose Gikunju and other enumerators for their help with data collection. For the farmers who took their precious time to volunteer information, it is my hope that this work will trigger interventions which will eventually trickle down to you. I am also greatly indebted to the credit officers, agricultural officers, extension agents and other key informants who provided useful information during the survey.

My appreciation also goes to the University of Nairobi for the award of the two-year scholarship that facilitated the study. A vote of thanks to Dr. Joseph Karugia and Professor Oluoch-Kosura for providing financial support for research under the broader USAID 'Strategies and Analyses for Growth and Access' (SAGA) Project titled 'The role of rural factor markets in reducing poverty, risks and vulnerability in rural Kenya'.

Above all, honour and glory be to the Almighty God for inspiring and seeing me through this study.

Thank you.

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LIST OF ABBREVIATIONS

AFC	Agricultural Finance Cooperation
CBOs	Community Based Organizations
GDP	Gross Domestic Product
KTDA	Kenya Tea Development Authority
KWFT	Kenya Women Finance Trust
Ln	Natural logarithm
LR	Likelihood Ratio
LRI	Likelihood Ratio Index
MFI	Micro Finance Institutions
NGOs	Non Governmental Organizations
PRSPs	Poverty Reduction Strategic Papers
RoSCAs	Rotating Savings and Credit Cooperatives
SACCOs	Savings and Credit Co-operatives
SMEP	Small and Micro-Enterprises Program
WEDCO	Western Development Cooperative

ABSTRACT

The increasing land scarcity due to rapidly expanding population has raised two key concerns for rural development policy. First, any increase in land productivity can only be achieved by intensification of farming activities. Secondly, while land is regarded as farm households' most important productive asset, it is becoming apparent that the parcels may be too small to make any meaningful contribution possible to incomes. Consequently, questions have been raised on the viability of agriculture as the basis for poverty reduction in rural Kenya and whether desirable policy goals would therefore be more financial investments on current portfolio of land or in off-farm sector. But regardless of the interventions pursued, financial capital is central yet the smallholders lack access to a range of financial services for risk coping and for improving their productivity in a significant manner. This study sought to establish a clear link between the micro-level activities in which the rural dwellers engage and the demand, range and factors that influence their likelihood and extent of participation in the credit markets.

The study employed a livelihoods approach to two data sets obtained from samples of farm households living in Kakamega and Vihiga Districts. The data was analyzed using descriptive statistics and regression analysis. The analysis of the income structures revealed that the share of off-farm income in total household income is relatively higher (60%) in the land-constrained Maragoli location (Vihiga) than in land abundant Shirugu location (50%) of Kakamega. Further analysis of the income distribution also indicated that while increase in land productivity is important in securing improved livelihoods for rural dwellers, it may not be sufficient to enable them escape poverty. Growth of non-farm sector is necessary especially in regions with declining land access and must be emphasized if such households are to escape poverty. This means that while agricultural credit is necessarily important in such areas to improve land productivity,

the evidence on income structures points to the necessity for promotion of a broad array of financial services that are likely to expand space of non-farm activities. This would augment their livelihoods and reduce their vulnerability to shocks such as drought.

While access to credit is crucial in facilitating both farm and off-farm investments, only 13% of the total sampled population reported receiving formal credit. The low participation was attributed to stringent requirements by the formal lenders. The financial institutions mostly offer specialized products hence are unable to meet the diverse financial demand of rural households. The estimated Logit and Tobit models to explain likelihood and extent of participation in formal credit markets in Maragoli and Shirugu locations indicated that the level of education and possession of a formal savings had positive influence on households' participation in both regions.

The study concludes that since the majority of the rural poor still depend on land-based agriculture, even where land is scarce such as in Vihiga district, the immediate course of action must lie in increasing the productivity of the natural resource base (mainly soils). In this regard, investments in mineral fertilizers, high yielding and high value varieties (such as horticultural crops) are vital yet evidently lacking in the study locations, especially among the resource poor. But these must also be integrated with expansion of extension services and improvement in access to product markets. The study recommends promotion of education and mobilization of savings to improve financial services delivery and spur broad-based development in the rural areas. It also underscores need for further evaluation of the marginal effects of access to credit on various categories of household incomes and welfare aspects in Kenya.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Poverty reduction remains one of the greatest challenges facing the Kenyan government today. With an estimated 56 percent of total population classified as absolutely poor (GoK, 2002), the situation is widespread and continues to plague the country since independence despite the government's efforts to combat it (Manda *et al.*, 2001). The total number of poor Kenyans has also been increasing over time. For instance, the numbers of those living below the poverty line were 3.7 million in 1972, increasing to 11.5 million in 1994 and to over 12.6 million in 1997. The growth of the country's GDP also fell from an annual 7 percent in the 1960s to 5 percent in the 1970s, 4 percent in 1980s and 2.4 percent in 1990s (Freeman *et al.*, 2004).

While several economic policies and sector reforms have been pursued by the government in attempts to reverse the situation, the agricultural sector has formed the thrust of the country's poverty reduction efforts, economic growth and employment creation since independence. This is evident in the 1st to 8th National Development Plans and the recently formulated Poverty Reduction Strategic Papers, PRSPs (GoK, 2001). Indeed, the majority of the rural dwellers in the country and across the developing world continue to rely on this sector directly or indirectly as a source of livelihood (Haggblade, 2004). However, in recent years, the growth of the sector has almost stagnated (Nyoro *et al.*, 2001). This has impacted negatively on rural livelihoods; the rising levels of poverty in the country have been partly attributed to the poor performance of the sector (Nyoro *et al.*, 2001; Ackello-Ogutu, 2004).

A number of constraints have been identified as contributing to the decline in farm productivity (GoK, 1999; GoK, 2004). These include factors such as land scarcity, poor marketing infrastructure, rising costs of inputs and lack of modern farm input use such as fertilizers and hybrid seeds, poor extension and stagnating technology, lack of insurance for crop losses and poor infrastructure. Consequently, these issues have been earmarked and solutions are being pursued in order to revitalize the growth of the sector (GoK, 2004). Whereas some of these constraints can be readily and adequately tackled at the sector level, some may require complementary policies in order to secure improved livelihoods for the majority of rural households faced with the constraints.

The increasing land scarcity due to population pressure and the subsequent sub-division along inheritance lines has meant considerable reduction in cultivable area. While in the past increased agricultural production was achieved through expansion in area under cultivation, this is no longer feasible especially in the medium and high potential regions of the country where agriculture is concentrated. Some of these regions have population densities in excess of 1,500 persons per square kilometer (GoK, 2001) and are characterized by very small farm sizes, averaging 0.6 ha (KARI, 1994). The result has been two major implications: first, is that any increase in agricultural output can only be achieved by more intensified production and rising productivity (GoK, 1994). This would involve use of modern and improved technologies (such as improved seeds and high yielding inorganic fertilizers) but adoption of these technologies is dependent upon funding for the generally resource-constrained smallholders (Nyikal, 1990, 2000; Oluoch-Kosura and Ackello-Ogutu, 1998). Addressing the farm household's credit constraints must then be given priority in improving their productive efficiency.

Secondly, while land is arguably the farm households' most important productive asset (Jayne *et al.*, 1992), there is now increasing concern that it may cease to be so as the parcels may have become too scarce to make any meaningful contribution possible to incomes. Past studies in Kenya (such as Marenya *et al.*, 2003) have revealed that the rural poor are already landless or have described themselves as having parcels that are too small to yield adequate incomes, even with intensified production. The crucial question then is what alternative assets and livelihoods options can be exploited to enable them command descent livelihoods and reduce their vulnerability to poverty?

Access to financial capital (mainly credit and savings) is often singled out as the key to which the vicious cycle of low incomes in the rural areas can be broken and the productivity increased, resulting in improved incomes (Gyekye *et al.*, 1977; World Bank, 2001). Access to credit would at farm level, enable farm households meet the shortfalls in their savings and invest in high return crop and livestock enterprises capable of raising sufficient incomes to lift them out of poverty. In this regard, the rural financial markets are seen to hold the future to the transformation of subsistence to commercial production (Heidhues *et al.*, 1998). The financial markets could also provide insurance and savings services to cover the co-variant risks such as droughts that farm household face and frequently threaten their survival.

Access to financial capital can further enable households to diversify income and invest in off-farm enterprises and asset portfolios such as human capital (Eswaran and Kotwal, 1990; Zeller *et al.*, 1997). Burgeoning literature across sub-Saharan Africa and indeed in the developing world has pinpointed to the increasing importance of this non-farm sector (Ellis, 2000; Barrett *et al.*, 2001a). The non-farm income generating activities have shown a positive correlation with income and wealth accumulation and therefore

could provide a pathway out of poverty if the existing opportunities are exploited and sector expanded (Barrett *et al.*, 2001a; Tegemeo, 2001). Increasing the opportunities, profitability and range of such activities would improve living conditions and help smooth incomes and consumption thus reducing their vulnerability to poverty (Mwabu and Thorbecke, 2001). However, because of several constraints (mainly capital) the rural households are unable to take up and utilize these opportunities (Ellis, 2000).

The standard approach in poverty reduction has been to look only at the production side role in agriculture as providing the rationale for credit in rural areas (Zeller *et al*, 1997). The needs of farm households for credit services for investments on education, training, insurance and until recently off-farm income generating activities were often ignored. Well functioning rural financial institutions would provide the farm households with the opportunities to improve and diversify income generation base and thus easing pressure on natural capital (land) especially where access is low or severely constrained. This way it would enhance their risk bearing ability and alters its risk coping behaviour (Jacoby and Skoufias, 1997). The mere knowledge that credit or savings services will be available to cushion against income risk should a potentially profitable but risky investment turn out badly may induce a household to bear additional risks (Zeller *et al.*, 1997).

However, access to financial capital is no panacea for poverty alleviation in the rural areas (Diagne and Zeller, 2001). Several pre-conditions are necessary for improved access to financial services to translate into improved rural livelihoods.

1.2 The Rural Financial Institutions in Kenya

The rural financial institutions refer to sources that offer credit and savings services to rural households (GoK, 1994). In Kenya, two broad types of financial institutions can be distinguished namely: the formal and informal financial institutions. The formal institutions consist of the conventional suppliers of loanable funds. These are subject to the control of the Central Bank of Kenya and include institutions such as savings and loan institutions, Micro Finance Institutions (MFIs), Non Governmental Organizations (NGOs), commercial banks, co-operatives, and parastatals. The informal institutions operate outside the control of the central authority and include friends, neighbors, relatives, landlords, local welfare associations, contribution clubs, informal level groups and moneylenders. It could be the most important source of finance for many smallholders (Von Pischke, 1973).

The performance of formal financial institutions in Kenya in terms of alleviating financial constraints facing the smallholder sector has been dismal (Atieno, 1994; IPAR, 2000; Nyikal, 2000). Specialized credit institutions offering subsidized agriculture credit such as the malfunctioning Agricultural Finance Cooperation (AFC) created by the government have failed to effectively reach and serve the farmers and have been largely unsustainable. This has been as a result of mismanagement and liquidity problems partly due to political patronage and low repayment rates (GoK, 1994). The financial institutions are also deficient in the range of financial products that they can offer to the poor and therefore have been unable to meet their diverse investment needs (Atieno, 2001).

Despite the many problems experienced with these financial programs, the government recognizes that the rural sector cannot grow without provision of appropriate financial

services. It is therefore committed to supporting innovative and efficient rural finance and credit supply for smallholders and processors such as the proposed Rural Development Fund. It is also developing modalities of support to micro-credit schemes through financial organization. (NGOs), Community-Based Organizations (CBOs), and rural Savings and Credit Cooperatives (SACCOs). But it is not clear what course of action the government will take in achieving these objectives and what kind of financial services the smallholders demand given the environment they reside.

1.3 Research Problem

Rapid population growth and the subsequent reduction in available arable land has resulted in breakdown of the traditional fallow system. There is now urgent need for more intensified farm production through use of purchased farm inputs to increase farm returns. This spells the need for more financial investments at the farm level. On the other hand, while land redistribution may be necessary to ensure equality and poverty reduction (Lipton, 1991), in densely populated areas, there is now major concern that land may be too scarce to make any meaningful contribution possible to household incomes, even with the intensification (Radwan, 1993; GoK, 2004). It may then be important to begin placing policy emphasis on access to alternative productive resources so as to secure improved livelihoods.

It is often hypothesized that access to financial capital has a central role to play in high population density areas and where per capita land holding is likely to fall (World Bank, 2001). Therefore adequate availability of financial capital will form the foundation upon which the productivity of the rural poor will be raised. It is now acknowledged that the greatest impediment to participation in high return (capital-intensive) activities among the poor is universally unaffordable access to rural financial markets (World Bank, 2001). This is also occasioned by missing markets for appropriate financial products to cater for the diverse investment needs of the poor (IPAR, 2000; Atieno, 2001). Such include investments in new farm technologies, human capital (such as education of children and health) and until recently in off-farm enterprises that are often ignored but must now be integrated in rural development efforts. This is now vital so as to raise productivity of the poor and enable them generate sufficient incomes given their meager land holdings.

However, the rural households have further been observed to be reluctant to seek for funds even where the services are available against popularly held belief that they are credit-constrained (Nyikal, 1990). This has raised concerns as to whether the available products are suited to the needs of the households and what factors determine households' participation in them. This study sought to provide answers to these emergent research questions:

1. What are the greatest contributors to household incomes by income quintiles? Are these mainly land-based or non-land based own-farm production or off-farm activities?
2. What are the potential benefits (poverty reduction) of more financial investments on current portfolio of land (in terms of fertilizers and improved seeds) compared to more investments in human capital (entrepreneurial training programs, greater access to primary and secondary school for children and vocational training)?
3. What kind of financial services do the rural households demand?
4. What are the factors that determine households' participation in rural financial markets and how can these be enhanced?

The present study aimed at providing answers to the research issues posed and to develop a clear understanding of the broader financial services needs of the rural households.

1.4 The Objectives of the Study

The overall objective of the study was to investigate the micro-level activities in which the rural households engage, the demand and factors influencing their participation in the financial markets.

The specific objectives of the study were:

1. To determine the categories of household assets that explain differences in household incomes hence explore role of financial markets.
2. To examine structure, nature of transaction and product range of rural financial institutions.
3. To examine credit and savings services demand by the rural households.
4. To analyze the factors that influence likelihood of household's participation in the formal credit markets.
5. To analyze the factors that influence the extent of participation in formal credit markets.

1.5 Hypotheses Tested in the Study

The following hypotheses were tested.

1. The household head characteristics, household resources (mainly land holding size) and institutional factors have no significant influence on household income status (per capita income).
2. The household head characteristics and household factors have no significant influence on their likelihood of participation in formal credit markets.
3. The household head characteristics and household factors have no significant influence on the extent of their participation in formal credit markets.

The household head characteristics considered in hypothesis one were gender, education level and age. The household factors included size of cultivated land, value of non-land based assets, livestock holding size, household size and households' dependency ratio, institutional factor considered here was access to markets.

Under participation in formal credit markets, household head characteristics considered were gender, education level, main occupation and age. The household factors included were land-holding size, value of non-land based assets, household size, amount of off-farm income and households' dependency ratio.

1.6 Justification

The persistence of poverty in Kenya has suggested that the current key intervention points in poverty reduction may have been inadequate (Manda *et al.*, 2001). An examination and adequate understanding of the resource limitations and key income sources of rural poor is vital in re-establishing appropriate strategies. While land-based agriculture has been the focus of many poverty reduction strategies in the rural areas where poverty remains acute, in certain regions such as Western Kenya, rapid population growth has resulted in very small farm sizes. It is now conceivable that households may not climb out of poverty solely through growth in farm productivity (Marenya *et al.*, 2003). The growth of the off-farm sector may therefore be fundamental to complement efforts meant to directly increase smallholder productivity such as farm credit in rural economy of Kenya dominated by small farms.

However, an assessment of the growth potential of the rural off-farm sector must start with attempts to establish the quantitative importance of the sector and hindrances to its expansion. The national aggregation of data has not permitted a very nuanced assessment of this in specific regions of the country. The current study aimed at providing empirical evidence of the relative importance of the on-farm and off-farm sectors investments. And it also aimed at informing policy on the impediments to smooth functioning of the rural financial markets in Kenya that condition both on-farm investments and diversification out of agriculture. Studies on credit (such as Musebe *et*

al. (1993) and Nyikal (2000) in Kenya) focused mainly on agricultural credit ignoring their other investments such as in asset accumulation including human capital and until recently in off-farm income investments (Zeller *et al.*, 1997; Pederson, 2003). There is need to model the farm household as a whole, taking into consideration its various financial services needs (Nyikal, 2000).

Atieno (2001) further noted that most studies on access and participation in credit markets in Kenya have been qualitative in nature. Empirical assessments are evidently lacking yet vital in in-depth understanding of the operations and guiding design and implementation of credit programs to effectively reach an estimated 12 million Kenyans who do not have access to credit (GoK, 1999). It is envisaged that the results of this study will be useful in guiding policy formulation on the kind of interventions that are likely to be effective in improving access to credit and achieving poverty reduction goals in the rural areas.

1.7 The Structure of the Thesis

The thesis is organized into five chapters. Chapter one has covered the introduction part detailing the resource limitations facing farmers and the role rural financial markets would play if access and participation were enhanced, the problem, objectives and hypotheses of the study. Chapter two gives the definitions of key terms used in the study, reviews past studies related to the problem and gives the relevant literature on characteristics of financial institutions. It culminates in a brief review of past models used in access and participation in credit markets. Chapter three discusses the study methodology including the conceptual framework, study areas and survey design, data collection and analyses. Chapter four presents the results of data analyses while the last chapter (five) gives the conclusions and recommendations for policy and future research.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Definitions and Conceptual Issues

Livelihoods refer to capabilities, entitlements, assets, and activities through which people gain means of survival (Carney, 1998; Scoones, 1998). A livelihood is sustainable when it can cope with and recover from stresses and shocks or maintain its capabilities and assets both now and in future. Other related terms used in the study are:

Poverty refers to inadequacy of income, lack of access to productive assets such land, credit as well as social infrastructure and markets (GoK, 2001). Poverty is this study is defined in relative terms. This gives the economic status of an individual or group relative to a reference group in the society and is described with reference to income quintiles (20^{th} percentile cut-offs) as used in earlier studies such as Government of Kenya (1998) and Tschirley and Kiiru (2001). Those households that fall below the bottom 20^{th} percentiles of income are classified as poor.

In the study, *risk* is defined as variability in income. Zeller *et al.*, 2003 distinguishes between covariant and idiosyncratic risks. The former is widespread and may affect the whole community such as drought while the latter may only affect certain individuals or households. This category includes diseases and labor loss due to death of a member of household. *Vulnerability* is viewed as exposure to the downside risks and the inability to cope (Moser, 1998). The most vulnerable households are those highly prone to adverse shocks and lacking assets such as credit or social network systems. The study examines the degree of asset diversification and how the different asset categories contribute to household incomes to infer household vulnerability (World Bank, 2001: p20).

2.1.2 Income Sources

According to Barrett *et al.* (2001b), the non-farm and farm incomes revolve around sectoral classification derived from standard accounting procedure whereas on-farm and off-farm distinction reflects the spatial distribution of activities with off-farm income being generated away from one's own land (Barrett and Reardon, 2000). The current study adopted the latter classification and has defined its components as follows:

Crop income- is the net incomes from all crops produced by a household including values imputed from home consumption.

Livestock income- this category includes the net returns from traded livestock and livestock products. This also includes income earned from use of animal draught power and imputed values of home-consumed livestock/livestock products. Net sales of livestock income was computed as difference between sales and purchases for the year 2002/2003 while net value of livestock products is the difference between value of livestock product sold mainly milk and the associated variable costs in the same year.

Informal income- this category includes incomes earned by farmer/household members by participation in informal labour activities (working on other people farms and in other labour intensive local off-farm activities).

Rental income- incomes earned from rentals (rented land and houses).

Transfers- includes earnings from pensions and remittances.

Business income- includes profits earned by household members from self-employment.

Salary income – This category included the gross value of wage earnings from regular employed household members in government and private sector employment.

Total off-farm income-includes all wage earnings from informal labour activities (away from own land), government and private sector employment, transfers, rentals and profits from self-employment (businesses) above.

2.2 Rural livelihoods and Role of Rural Finance

The farm households being conscious of the risks they face will attempt to be risk averse to avoid the possibility of occurrence of a shock that would threaten their livelihood or survival. Consequently, many of them borrow, more save and nearly all insure (Zeller, 1999). Alderman and Paxson (1992) distinguished two stages in farm households' response to these risks. In the first stage, termed risk mitigation, households engage in actions aimed at reducing the impact of the shocks. Risk mitigation is usually achieved through asset and income source diversification and insurance among farm households. The common diversification strategies employed by farmers are planting different crops and plots, combining off-farm and farm income in rural areas and wage and salaries from the urban sector. This way, the farm households seek to protect themselves against the shocks before they occur (ex-ante).

At the second stage, referred to as risk coping, farm households' cash in on insurance or savings: selling livestock or other assets, or calling on support networks for transfers or loans (World Bank, 2001). The households may also increase their labor supply, work more hours, involving more women and children. The poor may also reduce consumption and go hungry, further reducing their labor productivity. These mechanisms occur after the shock and help farmers protect consumption patterns from income variability (Murdoch, 1995). When this demand for consumption smoothing is not met, production credit is diverted into consumption (Zeller, 1999). Advancement of loans-in-kind in most small farm credit programmes may not deter the diversion (Nyikal, 1990); it only increases the transaction cost of diversion for the poor farm households (Zeller *et al.*, 1997). This has suggested need to tailor financial products to meet the specific needs of the farm households. However, the current study

concentrated on need of financial services for risk mitigation but also briefly examined their role in risk coping among farm households.

The smallholders employ both formal and informal strategies in risks mitigation. Looking at the farm production function itself, access to credit can facilitate farm households' adoption of risk-reducing inputs such as investments in irrigation equipment, fertilizers, drought resistant varieties and pesticides or vaccination of animals. Access to financial services can further enable farmers diversify income earning activities[1]. This is often the most popular strategy employed by farm households to smooth the flow of income over time (Bryceson, 1996; Suryahadi *et al.*, 1999; Ellis, 2000; Barrett *et al.*, 2001a). But where the possibilities for effective diversification are limited mainly due to capital constraints, poor farmers will specialize in low risk, low return activities, further deepening their poverty (World Bank, 2001).

Credit services can also be used to augment the human capital base of farm households and make it more resilient against shocks (Zeller *et al.*, 1997). Investment in human capital can further enable farmers adopt high yielding technologies thus enhancing risk-resilience among farmers. Households savings accumulated in prior periods can also be divested and used for the acquisition of physical and human capital to boost income generation thus reducing income shocks. In this regard, improved access to financial services raises the expected value of households earnings and therefore of future investments and asset accumulation (World Bank, 2001).

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[1] Dercons (1996) contend that diversification as a risk mitigating strategy is only effective is there is low co-variance between the income sources.

Households can also enter into credit associations such as Rotating and Savings and Credit Associations (RoSCAs). Rosenzweig (1988) and Fafchamps and Lund (2003) found credit to play an important role in risk sharing in communities while studying informal insurance arrangement in rural India and Philippines respectively. However, Dercons (2000) observed that the informal and group-based risk-pooling mechanisms could only be effective in tackling idiosyncratic risks facing farm households. The study noted that such informal insurance among farm households in same locality were ineffective against co-variant risks, which is the predominant type of risks farm households are faced with.

Skees (2000) noted that such co-variant risks would require a mix of insurance and financial products (emergency loans, liquidation of savings) and provision of safety nets. But he noted that formal insurance mechanisms were not of much assistance to the rural households as they are evidently lacking hence the need to explore their inclusion in financial outreach programmes. The strength of finance for risk management lies in the knowledge that the services (savings or credit) will be readily available when needed (Zeller, 1999). Zeller *et al.* (1997) censure governments' emphasis on provision of safety nets after the occurrence of the shocks. They stress the need to focus on risk reduction and mitigation strategies arguing that such measures would provide a faster, cost effective and sustainable approach than public investment in the safety nets after the occurrence of the shocks[2].

Zeller and Sharma (2000) argue that the shortcomings of institutional principle of which traditional lenders relied, based on collateral lending or organizational set–up do not

[2] However, Zeller and Sharma (2000) underscore the need for a comprehensive strategy comprising a wide range of policy instruments including provision of safety nets to address risks and vulnerability.

have any incentive in doing business with the poor and the pervasive political patronage severely handicapped their performances. Not only did they fail to serve the poor but their inefficiencies made them so dependent on state subsidies that they became financially unsustainable. This has triggered financial reforms in efforts to rectify the distortions. The overwhelming evidence of the successes of operations of many micro-credit programmes in the developing world have provided the evidence of considerable financial product innovation and of their potential in poverty alleviation and therefore of public investment in these programs. However, these features are unique to specific regions and therefore need for research to identify serviceable demand factors that will enable expansion of current credit programmes to effectively serve poor rural households. The next section takes a look at some of these successful innovative financial programs.

2.3 Innovative Credit Programmes

These refer to new or modified financial services that did not exist in the market before or substantially differ from existing ones (Von Stein, 1991). They refer to innovations that ameliorate the lending institutions orientation towards consumers demand for the financial services. While it is apparently easy to provide credit than savings and insurance services, this approach assumed that the poor required only cheap credit, ignoring their demand for savings services (Thillairajah, 1994). In offering demand-oriented, accessible, and sustainable financial services, financial institutions can significantly contribute to generating income and improving households' food security. The search for financial services with poverty reduction perspective leads to institutions with new forms of collateral (institutional innovations), diversified lending portfolios, and offers savings and even insurance services.

Micro finance pioneers such as Grameen Bank in Bangladesh and the village banks of Bank Rakyat in Indonesia have provided financial services matching the need of the low-income clients. They use collective monitoring through group lending to strengthen repayment performance, and charging interest rates that fully cover the operational costs. The approach has been particularly effective in reaching the rural women (Morduch, 1999). Bank Rakyat in Indonesia has circumvented the notion of low savings in low-income regions and currently has more than 16 million low-income depositors (World Bank, 2001). This is further supported by the operations of SafeSave, an NGO in Bangladesh that has adopted the principle of traditional RoSCAs. These institutions have demonstrated that credit and savings can be combined to create more sustainable institutions with high repayment rates. But despite the existence of these institutional innovations, several constraints to the broader role of rural financial markets in poverty alleviation still exist (Zeller *et al.*, 1997). The rural financial markets have special features that make them inaccessible to the poor farm households in the rural areas. The following segment discusses these special features.

2.4 Characteristics of the Rural Financial Markets

In most developing countries, rural financial markets are characterized by dualism: the co-existence of the formal and informal financial institutions (Aryeetey and Udry, 1997). Despite this fragmentation, the markets have been noted to have failed in that they have been unable to satisfy the existing demand for financial services in the rural areas (Atieno, 1994). While the inability of the informal finance to meet credit demand is due to inadequacy of resources, Aryeetey (1995) attributes the inability of formal finances to meet the credit demand to difficulty in loan administration such as screening and monitoring, high transaction costs, and the risk of default.

The rural financial markets are also characterized by information asymmetry and poor contract enforcement mechanisms (Hoff and Stiglitz, 1990). The traditional solution has been for the lenders to demand collateral (Binswanger *et al.*, 1989). But since most poor rural households cannot afford the collateral requirements, they are excluded from the formal credit services. The different segments therefore serve clients with distinct characteristics and are therefore unable to meet the need of borrowers interested in certain kind of financial products (Atieno, 2001).

Due to imperfect information, the lenders cannot use the interest rate to sort out the potential borrowers because this would only increase their risky loan portfolios (Stiglitz and Weiss, 1981). The result is the occurrence of credit rationing, adverse selection and moral hazard problems that hinder the smooth operation of the rural financial markets (Udry, 1994). Adverse selection occurs due to imperfect information such that the lender may not know the person he is dealing with and in making decisions to award the loans he is forced to choose among those who had applied (Besley, 1994). The result is that applicants are unable to borrow as much as they would want and still others are denied loans (credit rationing). On the other hand, moral hazard occurs because projects may have identical mean returns but different degrees of risk, therefore the lenders are unable to discern the action of the borrowers once the contract is sealed (Stiglitz and Weiss, 1981).

Besley (1994) noted collateral security and co-variant risk as being the major features explaining the operations and co-existence of the formal and informal financial market systems. He argued that collateral requirements of most formal lenders is beyond the reach of many smallholders in the rural areas and that enforcement of the loan contract is also difficult; hence the informal arrangement uses social sanctions and collateral

substitutes to enforce repayment. Shocks in the incomes of the rural dwellers especially the farmers also create high risk of borrower default, and may affect the lenders operation. The farmers are faced with risks arising from the uncertainties about their incomes, but the lenders would want to diversify their loan portfolios rather than concentrate loans on borrowers facing common shocks (Kiiza and Pederson, 2001).

Another distinct feature of both formal and informal credit relates to the penalties. In absence of proper loan contract enforcement mechanisms, both formal and informal financial institutions rely on policies that emphasize loan screening rather than monitoring, which seems to suggest more concern with adverse selection rather than moral hazard. However, differences emerge in the approaches used by these segments. While the formal lenders rely on project screening, informal lenders put more emphasis on the character and history the borrower, particularly on personal knowledge. Because of this, the informal lenders rarely carry out loan monitoring. The formal lenders sometimes do but are limited by the high transactional costs involved.

The current study examined how these bottlenecks in formal credit markets can be addressed to improve service delivery to rural households to enable them improve their productivity in a significant manner.

2.5 Access to Rural Financial Markets

Access to credit by the smallholders is one of the major problems facing them partially due to the legal and regulatory framework (Atieno, 2001). Atieno noted that access problems especially concerning the formal lending institutions is one created by the institutions lending policies. This is reflected in the form of prescribed minimum loan amounts, complicated application procedures and restriction of credit for particular

purposes (Thillarajar, 1994). The situation is coupled by the overall lack of information about credit worthiness, thus contributing to the virtual exclusion of the poor smallholders from accessing credit. McLeod (2001) noted that there is tendency to risk aversion by the formal lending institutions, in particular when it comes to lending to the poor.

McLeod posited that if the banks are ill disposed to lend to the poor customers with unknown credit worthiness and no banking experience, the institutions might resort to planning and building regulations in order to avoid doing so. The high cost of screening large number of small loans of doubtful credit worthiness, the evaluation and control of numerous small loans dispersed over distant areas, makes them shy away from lending to smallholders. There is also ample evidence to suggest that lending to small-scale farmers carries unusually high risks and is far too expensive for the commercial banks given the lack of infrastructure development and the anticipated low level of savings in the rural areas (Thillarajar, 1994). This group requires specialized financial products and as a result the potential borrowers may not apply for credit even where it exists, and even if they do so they may be denied the loans.

The experience of the Grameen Bank in Bangladesh and Bank Rakyat in Indonesia indicate that most of the requirements for advancement of formal loans like collateral should not be a hindrance to poor rural households from accessing credit services (Hossain, 1988; Patten *et al.*, 2001). Rather the poor, using group guarantee system and savings mobilization approach, can use loans and repay if appropriate financial products, effective procedures for disbursement, supervision and repayment are in place. They advocate for loan delivery systems that is adapted to the local market

condition and clientele, in order to cope with market failures and to distinguish fairly between genuine cases of customers' inability to pay.

Conclusively, many lessons have been learnt from the failure of supervised credit programmes, the thriving experiences of informal financial institutions and recent institution innovations by NGOs and MFIs for the rural poor. These encourage a fresh look at the broader role of rural financial markets in alleviation of poverty. But credit issues vary across social, cultural and economic circumstances (Nyikal, 1990) and therefore design of such financial programmes would first require an understanding of resource characteristics of a given region, the role that credit could play and a formal analysis of factors that determine their access and participation in existing credit programmes. This was the goal of the present study.

2.6 Review of Models Applied in Past Studies

In a study of formal agricultural credit in Vihiga division of Kenya, Musebe *et al.*, (1993) applied a linear regression analysis to determine the factors that affect the amount of credit received. The results revealed that the co-efficient of education was positive and significant in determining the amount of credit received by the farmer, indicating that more educated household heads were more aware of the credit facilities. Farmers with more off-farm incomes were also observed to receive more credit. The study noted further that the formal credit institutions demanded land title deed as collateral and off-farm income as an indicator of repayment capacity. However, the evaluation used a limited range of explanatory variables and it only focused on agricultural credit and therefore did not look at other financial products offered by the formal institutions.

The use of linear regression in the analysis of credit demand does not give a statement of probability on whether a household is likely to obtain credit nor does it capture the constraints experienced by the entire sample (Bell, 1990; Nagarajan, 1995; Elhiraika and Ahmed, 1998). The truncation of dependent variable is likely to give biased estimates because of omission of non-borrowers. These aspects can be best captured using probability and censored regression models that are employed in the current study focusing on general formal credit.

Kashuliza *et al.* (1996) undertook a study in Mbeya and Iringa regions of Tanzania to describe the types and operations of informal and semi-formal agricultural financial arrangements. They used a logistic regression model and t-tests to identify the factors that account for credit access among farmers and to measure the impact of credit use. The results showed that the education and gender of the borrowers were significant in explaining their access to credit. They also observed that formal credit use only accounted for a small portion of total credit transactions and was mainly confined to the relatively rich farmers. They emphasized that such studies needed to be carried out elsewhere to generate more conclusive results.

In an assessment of the rural credit markets in Malawi, Diagne (1999) employed the concept of credit limit variable (the maximum amount a household can borrow) to analyze the determinants of extent of access and participation in the formal and informal credit markets. Using simultaneous Tobit models, the results showed that the unobserved credit program attributes were statistically significant in explaining household's decision to participate in formal credit markets. The decision to participate also increased with knowledge about the existing credit programmes and proportion of land cultivated. In opting for the two types of credit, the non-cost attributes were more

important to the borrowers in accessing the informal loans. They concluded that access to credit was much more important to the households than the cost of credit per se, emphasizing that credit policies should focus on making access easier rather than providing subsidized loans. While the methodology used was comprehensive and analyzes the underlying credit constraints, the data requirement is enormous and would be expensive and difficult to collect in regions with diverse formal lenders such as rural Kenya. Nevertheless, Kenyan case studies are needed to inform policymakers of the same issues.

Other studies such as Kiiza and Pederson (2001) have also used bivariate logistic model to analyze the factors that affects households' participation in micro-credit programmes and their investment behaviour in Uganda. The outcome of the analysis indicated that proximity to the institution, dual sources of income and income stability influenced the rural households' participation in the credit programmes. The co-efficient of education had the expected positive sign, indicating that the likelihood of participation increased with the level of education of the borrower. The estimated model also found that farmers were less likely to participate probably because of the uncertain nature of farm income. In the analysis, they acknowledged that the use of logit model does not capture the underlying credit constraints but noted that it served the useful purpose of identifying factors that are important in the initial design and implementation of credit programs to reach poor households. The current study adopted this approach.

Atieno (2001) examined the lending institutions policies that determine access and use of credit by small and micro-enterprises in Kenya. The results of her study disclosed that majority of the entrepreneurs had not used credit before. This was majorly due to lack of information and collateral, reinforcing the argument that the small-scale rural

based enterprises do not have access to formal credit. Using descriptive statistics, she noted marked differences between the amounts of loans applied for and received in both sectors indicating credit rationing. A significant difference between the loans terms and requirements of formal and informal sector was also observed. The study argued that the limited credit use was due to inadequate credit supply, thus attributing it to the supply-side constraints.

Nevertheless, no differences were observed in household and enterprise characteristics of the loan and non-loan users, alluding to adverse selection in the credit markets. The study however lacked an assessment of the degree to which the various socio-economic characteristics influenced their access and participation in credit markets. This information would be necessary to inform policy makers on factors that could be important in design and implementation of credit programs to reach marginalized households (Kiiza and Pederson, 2001). This can be achieved by the use of econometric models that are employed in the current study focusing on general formal credit.

The current study used a logit model to analyze the determinants of likelihood of households' participation in the formal credit markets in the study areas. But since the use of discrete choice models such as logit does not capture the degree or intensity of participation (Greene, 1993), the inadequacy was captured using a Tobit model. The Tobit model was used in the present study to analyze the determinants of extent of participation in the formal credit markets. The model was chosen because it can efficiently analyze both censored and uncensored observations. In addition, in econometric studies, data sets with censored and uncensored observations do not lend themselves to be properly analyzed using the ordinary least squares procedure (OLS). This is because the OLS procedure lumps together the censored and the non-censored

observations and may result in biased and inconsistent parameter estimates. Davidson and Mackinnon (1993) argued that in credit markets, the Tobit model is best suited to analyzing the credit demand. They emphasize that the models need to provide adequate correction for data censoring due to existence of borrowers and non-borrowers. In view of the foregoing, the current study used both the Logit and Tobit models to analyze the likelihood and extent of participation in formal credit markets respectively, in the study areas.

CHAPTER THREE

3.0 METHODOLOGY

3.1 The Conceptual Framework

The concept of livelihoods revolves around the opportunity set afforded to an individual or household by their asset endowment and their chosen allocation of these assets over various activities to generate a stream of benefits, commonly measured as income (Barrett *et al.*, 2001b). Diversification patterns therefore reveal a household's voluntary exchange of assets and the allocation of these assets over various activities so as to achieve optimal balance between expected returns and risk exposure conditional on the constraints they face. These constraints are land, labour and financial capital.

Households will choose an activity allocation vector v (a) for asset endowment, a, that yields an uncertain income return E(v(a)|C) from among a feasible set. The feasible set is defined by the intersection of nontradable inputs availability constraint equal to one's endowment level of the input (e.g., land, capital) and a budget constraint equal to one's current cash income plus access to liquid capital through savings or credit. Since income is a function of activity choice, it is an endogenous function of the prevailing (shadow) price distributions (C) for all factors, goods and services. So observed income patterns can be understood as a function of the constraints – including ex ante asset endowments (a) -- the realization of ex ante incentives (C) faced by the household, and its preferences.

Since rural households do not face identical constraints, geographical variation in transactional costs and gross market prices leads to cross-sectional heterogeneity in incentives due to differential access to markets. The transactional and contract monitoring and enforcement costs can be considerable, some households may choose to

self-select out of particular markets. This would ignite further the inter-household dispersion since households relative factor endowments affect on-farm productivity and therefore the allocation of productive resources between on-farm and off-farm activities.

Entry into higher income niches demands sufficient access to necessary financial and human resources. effectively constraining those who do not have adequate access. As a consequence. differences emerge in the feasible sets from which households choose the portfolio of activities from which they generate their livelihoods. These constraints not only impede some forms of diversification: they can also compel diversification into low-return activities.

Given this theoretical framework. it was conceptualized that households often seek to boost their incomes and reduce risk exposure by smoothing their incomes ex-ante before it is realized. often through asset and income sources diversification (Bryceson. 1996: Barrett *et al*.. 2001b: World Bank. 2001). The observed diversification pattern would therefore reveal what people currently consider to be the most attractive options given various incentives and constraints due to their environment.

This spells the needs for borrowed funds to meet these diverse investment needs. But their access and participation to financial institutions is restricted by their socio-economic status and lender characteristics such as credit limit. It is increasing clear that access to credit be enhanced so as to improve their productivity.

3.2 Description of Study Area and Survey Design

The study focused on two regions that lie in the medium and high potential areas of the country[3]. Agricultural production is mainly concentrated in these regions and coupled with the expanding population, the areas have become more and more densely populated. The smallholder farming systems in these areas have also become more intensified, reflecting the land scarcity (Bebe, 2003; Salasya, 2005).

However, to achieve the objective of examining the effect of declining farm sizes on livelihood diversification, it was necessary that the two regions have distinctively different land availability patterns. Several other key livelihood factors such as need to represent different agro-ecological zones, extensive verses intensive farming practices, access to infrastructure and non-farm income activities were also taken into consideration. This was aimed at providing a gradient for analysis of diverse rural livelihoods and to make generalizations derived from the study more meaningful.

Accordingly, primary data collection was carried out in two locations of neighboring districts of Kakamega and Vihiga in Western Province of Kenya. The two districts also provided unique opportunity to examine causes of poverty as they have poverty counts of 57.71 and 61.97 percent respectively, compared to the national average of 56 percent (GoK, 2002).

Kakamega District falls in a medium potential agricultural zone. It lies between longitudes 34^0 20' and 35^0 E and latitudes 0^0 18' and 1^0 of the equator. The region has varying topography with altitudes ranging from 1250m to 2000m above the sea level.

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[3] Jaetzold and Schimdt (1983) define this potential (for cropping and dairy) based on moisture supply and soil patterns, and it provides a useful indication of the natural land use potential.

The rains are bimodal, adequate but exhibit wide variations in distribution, ranging from 1000mm per annum in the northern parts to 2400mm per annum in the southern parts. The temperatures are high with recorded maximum of 32^0 C and minimum of 11^0 C but diurnal ranges are minimal.

The soils range from deep well-drained, dark brown friable clay loam soils to volcanic soils. Coupled with the adequate rains, the soils support a variety of crops such as bananas, beans, sugarcane and horticultural crops. Land tenure is mainly freehold and average land holding size is 5 acres. The population density of this region is estimated at 433 people per square kilometer. Some areas of the district such as Kabras Division that have abundant land holdings are attracting immigrants in search of arable land. Although the district ranks as the second richest in the province, its poverty incidence still makes it a poor district (GoK, 1997a; IEA, 2002). The high rainfall and the sloping terrain makes soils vulnerable to erosion but potential can be exploited by improving soil fertility and cash crop production on the relatively abundant arable land. Here, the survey was conducted in Shirugu location in Kabras Division, a region with relatively higher per capita land availability and ownership and good market access.

On the other hand, Vihiga District is a region of high agricultural potential. It lies on the Eastern fringes of the Rift Valleys' Lake Basin. Altitude ranges from between 1300m and 1500m above the sea level. The geological formation comprises of mainly Kavirondian and Nyanzanian rock system. These grinitic rocks present development bottlenecks by making accessibility difficult due to poor infrastructure. The district has a bimodal rainfall pattern with annual rainfall range of between 1800mm and 2000mm. The rains are well distributed, adequate and reliable for cultivation of a wide range of

crops such as tea, avocadoes, coffee and maize/beans. The soils are fertile and support a wide variety of crops as indicated above.

However, the district has a very high population density estimated to be as high as 886 people per square kilometre (IEA, 2002). It also ranks as the second poorest in the province with absolute poverty incidence of 61.97 percent (GoK, 1997b; IEA, 2002). Due to the high density and subsequent sub-division of land, the farm sizes have become very small. This has dictated the need for intensification of farming activities and livelihood diversification to enhance food security. In this area, Central Maragoli location was purposively chosen for the study with the help of agricultural field officers during the pre-test exercise. This is because it exhibits rapid agricultural development but relatively poor access and small landholdings as compared to Shirugu location.

Multi-stage sampling technique, based on administrative areas and population size, was used to select households in each of the above locations. Two sub-locations were randomly selected from each of the location. Then two villages were randomly drawn from each of the selected sub-locations. Table below shows a summary of the sampling procedure used in the survey.

Table 3.1 The sampling procedure for selecting study areas

District	Location	Sub-location	Villages
Vihiga	Maragoli	Kidundu	Kilindilu
			Wamulamo
		Chango	Kihilila
			Ivona
Kakamega	Shirugu	Malegha	Shipala
			Malegha
		Samitsi	Kalenda
			Samitsi

Source: Survey, 2004

At the village level, sampling frames of all farm households were constructed with the help of village elders. A systematic sampling procedure was then used to arrive at the farm households who were sampled in the survey. This resulted in a total of 104 and 112 farm households being interviewed in Shirugu and Maragoli locations respectively.

3.3 Data, Data Sources and Collection

The study used both primary and secondary data. Secondary data on geological and socio-economic characteristics of the study areas including the climate and crop enterprises were sourced from the Central Bureau of Statistics, ministries and other related past studies. The primary data collected consisted of both qualitative and quantitative data. Quantitative data was collected using semi-structured questionnaires that were administered to the sampled households' heads via person-interviews[4]. The report presented here was obtained from data collected by the author in a single-visit survey conducted in the months of May and June 2004. Information was collected on household socio-economic and demographic characteristics, income sources and levels for the season 2002/2003, access to essential services and issues related to land and credit markets. Also obtained was information related to kind of shocks experienced by the households in the last fifteen years and coping strategies employed.

Qualitative data was obtained through transect walks and via interviews held with key informants such as district farm management officers, credit officers, extension agents, local opinion leaders and village elders on issues regarding land tenure, credit situation and causes of poverty in the study locations.

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[4] A copy of the household survey questionnaire is attached in Appendix (ii).

3.4 Computation of Household Incomes

In this study, a 'household' was defined to comprise of a group of individuals living in the same house, eating together and contributing to income. This excluded unmarried sons and daughters working and living away from home. However, their contribution to household incomes was captured as remittances. Non-relatives such as shamba boys and house-helps who eat and sleep in the house were also included as household members. However, any income generated by these individuals was not included in the computed household incomes as such individuals usually remit income earned to their own homes.

The definition of income used in this study is fairly comprehensive and includes both income received in cash and in kind. Monetary value was imputed to receipts in kind and household consumption of crops and livestock[3]. For crops sold, the actual prices received by farmers were used to compute the crop earnings. For crops grown under rented land in season 2002/2003, rents paid by these households were deducted from profits accruing to those particular crop enterprises. However, family labour used in on-farm crop and livestock production was not valued. And since most households in the rural areas reside in their own houses, no attempt was made to impute rental values to own housing services.

3.5 Data Analyses

Two forms of analyses were considered in the study. These included descriptive and econometric analyses. The study used descriptives such as means, standard deviations, percentage, quintiles and cross tabulations to describe the socio-economic and

[3] For home consumed (auto-consumption) crops and livestock or livestock products, average village prices were used to compute the monetary values.

demographic characteristics of sampled households mainly distribution of assets owned, income sources and their share in total household incomes and participation in credit market. Where appropriate, the study related these to asset/endowments of the households.

3.5.1 Income Quintiles

The quintiles represent the 20th percentiles i.e. the sampled households were divided into five equal groups based on value of total household incomes. The rest (those that did not fall into any of the initial categories) were equally distributed in the lower quintile groups (see Maragoli and Shirugu locations quintiles in Tables 4.4 and 4.5). The resulting variations are insignificant (see Freeman *et al.*, 2004).

However, in order to explore further the structural relationships and interactions between various variables in the study, it was necessary to use econometric models. Below is a description of the econometric models employed in the study.

3.5.2 Determinants of Household Incomes: A Production Function Approach

The econometric model for analyzing determinants of household incomes is well established in literature (Tschirley and Weber, 1994; Malik, 1999; and Tschirley and Kiiru, 2000). Most empirical studies have used either the ordinary least squares or the lognormal or log-linear form. The use of lognormal form is commonly justified on the ground that the distribution of household incomes is highly unequal, but much closer to being lognormal in developing countries (Willis, 1987). Secondly, the use of ordinary least squares procedure also gives heavy weighting to the mean values of the dependent and explanatory variables in estimating co-efficients as compared to lognormal/log-linear forms (Bhorat *et al.*, 2001).

The study applied a Cobb-Douglas production function to estimate the effect of different levels of access to productive assets (mainly land) on households' output, measured as income. The function was preferred because of its basic consistency with established body of literature, its computational simplicity and its realistic fit (Heady and Dillon, 1961). The function accommodates diminishing marginal returns and easily incorporates dummy variables. It can be easily used in the linearized logarithm form and the slope co-efficients interpreted as elasticity of output with respect to the inputs (independent) variables in the model.

Wonnacot and Wonnacot (1979) give the general Cobb-Douglas power function as

$$Y = AX_1^{\beta 1} X_2^{\beta 2} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots X_n^{\beta n} \theta$$

Where Y – is the output, A – autonomous component of income, X_i – various inputs into the household income generating (production process), βs – are the co-efficients while θ - is the error term.

However, the model can be linearized to a double-log function, assuming that the relationship between the dependent and independent variables are linear. And following Greene (1993), the study employed a linearized Cobb-Douglas (double-log) regression model specified as

$$LnY = A + \beta_1 LnX_1 + \beta_2 LnX_2 + \ldots\ldots\ldots + \beta_n LnX_n + \sigma_n$$

Where ln Y-is the natural logarithms of household per capita income: β s- represent the respective co-efficients of the natural logarithms of explanatory variables, X_i, described below; ε - the error term (assumed to be independently distributed with mean of zero and a finite variance) while i and n refers to the first through to the last household.

The co-efficients in the model represents the respective elasticities, defined as the proportionate change in Y as a result of a proportionate change in X. The signs of the co-efficients indicate whether improved access to the various inputs/resources will result in improved household productivity.

Model Specification and Estimation

From an economic viewpoint, land is the basic resource in the production process in the rural areas where agriculture is the key source of livelihoods. Land productivity can be expressed in terms of output per unit of a single input (such as labour or land) or it can be expressed in terms of output per unit of total factor input (Kimenye, 1984). This output can be expressed in value terms and inputs (such as land, labour size, non-land based assets) in physical terms and or in constant prices to minimize fluctuations. Other non-conventional inputs such as skills (education), gender are also incorporated but are expressed as dummy variables or weighted factors.

Explanatory Variables used and Priori Expectations

Drawing from empirical literature, household productivity is a function of the resource endowments (human capital, land size, wealth status (livestock), household size (labour) and other non-land based assets) and that can be put into the income generation process. Other non-conventional inputs such as age and gender of household head are also included in the analysis.

Each individual or household will seek to maximize the value of output (income) from all the productive assets that it has access or owns. The priori expectations are discussed below.

Farm size (LANDSIZE): Land has conventionally been the most important resource and determinant of livelihoods in the rural areas (Jayne *et al.*, 1992). Therefore the larger the farm size, the higher would be the expected output generated by the household. This was expressed in terms of the number of acres owned by the household.

Education level of household head (EDUCYRS): Human capital is a vital input in income generation process of households. Higher education attainment may imply increased access to lucrative employment opportunities in the off-farm sector. Higher level of education may also play an indirect role in agricultural production because the better educated are more aware of new technologies and practices and are more likely to take these up to augment farm incomes as compared to the less educated (Nzuma, 2001). This was expressed as dummies depending on the level of education attained.

Non-land Based assets (PHYASSETS): Anything of value owned by household such as agricultural equipment, vehicles and machinery are expected to enhance earnings capacity of the household. It is hypothesized that the total value of the physical assets owned by the household will have a positive influence on output.

Value of livestock owned (LIVEVAL). This is the total value of livestock owned by a household as given by the farmer. This represents the wealth status and income generation potential of the household. Therefore it is expected that the value of livestock holding will be positively correlated with household productivity.

Household size (HSESIZE): Household size may affect household income generating ability in two ways. Large household sizes may boost the household labour resources resulting in higher output. On the other hand, higher household sizes decrease the ratio

of earners to non-earners in the household thus resulting in high economic dependency. Past studies show that a higher percentage of these large households are often children (Oyugi, 2000). This may influence productivity negatively.

Sex of household head (GENDER): Sex of household head may play a major role in determining household incomes if there is gender differential access to and control of productive resources. It is expected that male-headed households will have higher household incomes because of better access to and control of productive resources.

Dependency ratio (DEPRATIO): This is the ratio of number of household members (below 15 and above 61) to household size. Generally, the higher the dependency ratio, the lower would be expected household output because this group are generally less active economically, leaving higher burdens on the few family members involved in productive activities.

Age of Household Head (AGE): Older people are associated with experience and accumulation of social capital and wealth. These are expected to augment the income earning potential of the household.

Regional dummies: These were used in the regressions in the study to examine the effects of differential access to markets and infrastructure.

3.5.3 Modeling Households' Participation in Formal Credit Markets

The study defines *participation* in financial markets as the observed household borrowing as different from *access*, which implies that a household is able to borrow but for one reason or another may choose not to (see Diagne and Zeller (2001)). However, it is noteworthy that this participation in credit markets is conditional on having access (Zeller and Sharma, 2000).

It is conceptualized that the decision to participate in any formal credit program is affected by several factors. These factors may include the level of access to these institutions, the human resource level, total assets owned, and the degree of income stability of the household.

Assuming a random utility for each household, a borrower is influenced by the attributes of the option to participate in the formal credit program and by the attributes of the individual decision-maker. For the i-th borrower, we denote the utility of the decision to participate in credit program as U_1.

$$U_{i1} = x_i\beta_i + \varepsilon_i$$

and the utility of the decision not to participate as U_2

$$U_{i2} = x_i\beta_2 + \varepsilon_2$$

Where X_i is a vector of transaction and borrower characteristics and β_j (j=1,2,...n) are vectors of parameters.

The utilities (U_1 and U_2) are random variables and the i-th borrower is only observed to Choose the option of participation if $U_1 > U_2$

Where the subscripts 1 and 2 denotes households that choose to participate or not.

3.5.3.1The Logit Model

The likelihood of participation in credit market that we seek to model is discrete rather than continuous. This means that the dependent variable takes a limited set of values i.e. the dependent variable takes the value of 1 if a household is observed to borrow from a formal credit source for the year 2002/2003. 0 = otherwise. A form of qualitative response variable is therefore suited to analyze this phenomenon.

Binary choice models such as Probit and Logit models have been used to model this behaviour (Kashuliza. 1996: Mohieldin and Wright. 2000). The present study employed a Logit regression model to analyze the determinants of likelihood of participation in formal credit markets. The Logit model was preferred over the probit model because it is easier to compute (Greene. 1993). Authors such as Amemiya (1985) have also acknowledged the decision to use either model as a natural one since resulting co-efficients estimates are almost statistically similar.

In the Logit Model. the expectation of Y is a number P, which is related to the independent variables. (X) as follows (Pindyck and Rubenfield, 1981).

$$E(Y \mid X) = P = F(Z) = (\alpha + \beta X + U)$$

$$= 1/(1 + e^{-z})$$

$$= 1/\left[1 + e^{-(\alpha + \beta X + U)}\right] \qquad (1)$$

Where P = Conditional probability of participating given the values of independent variables. (X).

e = Base of natural logarithm which is approximately equal to 2.718.

α = Constant

β = Regression Coefficients

U = Stochastic error term

The equation (1) expressed above describes the Logistic probability function. However, when expressed in terms of odds, it becomes the Logit function and is expressed as below

$$\text{Prob (event)/ Prob (no event)} = \left[P/(1-P)\right] = e^{Z} = e^{(\alpha + \beta x + \mu)} \qquad (2)$$

Transformation of dependent variable in equation (2) above by taking natural logarithm on both sides allows the estimation of the logit model.

$$\ln\left[P/(1-P)\right] = Z = \alpha + \beta X + \mu \qquad (3)$$

If the ith household is observed to borrow, $y_i = 1$, otherwise =0. Thus, the observed borrowing is a function of vector of household and household head specific attributes. This model was estimated using the maximum likelihood method using LIMDEP version 8.0.

3.5.3.2 The Tobit Model

To analyze the factors that influence the extent of participation (Amount of credit received) in the formal credit markets in study areas, the study employed a tobit model (Tobin, 1958). This is a case of a censored limited dependent model. This means that data is available on explanatory variables X for the whole observations. But for the explained variable Y, actual observations are present for some while for others it known that they are above (or below) certain threshold.

According to Greene (1993), the general formulation of the model is an index function specified as

$$Y_i^* = \beta' X_i + \varepsilon_i$$

$$Y_i = y_i^* \text{ If } y_i^* > 0$$

$$Y_i = 0 \text{ If } y_i^* = 0$$

Where β is $k \times 1$ vector of unknown parameters; x_i is a vector of known constants as listed below; ε_i are the residuals that are independently and normally distributed with mean zero and a common variance σ^2. The dependent variable Y_i^* defines an underlying tendency to participate in credit programs. For convenience, the censoring point is for the model is usually assumed to be zero (Greene, 2000). This means that the latent variable for participation will only be observed when the borrowed amount is above a threshold ($y_i^*>0$). On the other hand, if y_i^* is less than zero, then y_i becomes zero meaning no participation (borrowing).

Decision to participate in credit program is attributed the households and lenders characteristics (Diagne, 1999 and Kashuliza *et al.*, 1996). In the current study, these were hypothesized to influence their participation in the credit markets and the study employed both the Logit and Tobit models to determine the likelihood and extent of participation in formal credit markets respectively. The section below gives the explanatory variables and the hypothesized direction of effects.

Age of the borrower: Age of household head may therefore influence borrowing positively or negatively. This measures local knowledge and experience of the household head (Zeller *et al.*, 2001).

Gender (Male=1, female=0): This captures institutional and cultural factors that determine participation along gender line. It is anticipated that these factors will affect female-headed households' participation negatively.

Education level of household head: The more educated are likely to be aware of the existing credit facilities and the application procedures. The likelihood of participation

in the formal credit programs will increase with knowledge of existing credit programmes.

Main occupation of farm household head (MOCCUP, dummy, if farmer = 1, otherwise = 0): Farmers are less likely to participate in formal credit programs. This is because most formal lenders consider farming to be an inherently risky business hence may not lend to farmers.

Household size: A large household size has various needs ranging from capital investment to consumption smoothing. Therefore it is likely to resort to borrowing to meet these needs. On the other hand, a large household size may reduce the household labour needs, thus reducing borrowing needs such as in hiring labour.

Land holding size: Traditionally, land has been the most important collateral demanded by formal lenders (Binswanger *et al.*, 1989). Secondly, that a farm household with larger land size is likely to seek credit to finance investments on the farm. In the model, it is hypothesized that this will influence households' participation positively.

Physical assets: This represents anything of value owned by a household. This indicates the ability of the household to meet collateral requirement of formal lenders. It is expected that this will increase the likelihood of participation in formal credit markets in the study areas.

Amount of off-farm income: This indicates the income stability of the household that is closely related to repayment performance desirable to formal lenders. Higher off-farm incomes may reduce households' borrowing needs because such households may be able to meet their investment needs without having to resort to borrowing. On the other

hand, higher off-farm income may also be desirable to lenders as it is relatively stable and a good indicator of repayment capacity. Therefore the direction of effect cannot be determined a priori.

Formal savings account dummy (SAVEACC), if household head has a savings account=1, otherwise=0. Possession of formal savings account is hypothesized to influence participation positively. This reduces the information gap between lender and potential borrower, thus increasing accessibility.

The objective is to maximize likelihood with respect to the parameters.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSIONS

4.1. Results of Descriptive Analyses

This section uses means, percentages and cross tabulations to describe relevant socio-economic and demographic variables and income distribution. Emphasis is put on ownership or access to assets, which can be put to productive use as the basis for which households can construct own pathways out of poverty (Sen, 1981; Davies, 1993).

4.1.1 Households Assets and Demographic Characteristics by Study Location

Table 4.1 below shows the distribution of some mean characteristics of sampled households by study locations.

Table 4.1. Households' socio-economic and demographic characteristics by study location

Variable	All (N=216)	Shirugu (N= 104)	Maragoli (N= 112).
Age of household head (years)	47.96	47.63	48.26
	(13.37)	(14.12)	(12.60)
Gender of Hhead (%) M=1, F=0	68.50	69.20	67.80
% Hheads with no formal education	10.20	8.70	11.60
% Hheads attended primary	24.50	26.90	22.30
% Hheads completed primary	26.90	29.80	22.30
% Hheads attended secondary	23.60	21.20	26.80
% Hheads completed secondary	12.00	9 60	18.20
% Hheads with tertiary and above	2.80	3.80	1.80
Household size	6.20	6.60	5.90
	(2.60)	(2.90)	(2.30)
Size of land owned (acres)	2.80	4.90	0.90
	(4.10)	(5.00)	(1.10)
Livestock ownership (cattle equivalent units)[6]	2.30	3.20	1.50
	(2.80)	(3.70)	(1.10)
Value of household assets (Kshs, 000)	51.10	67. 00	36.30
	(130.40)	(131. 40)	(130.40)
Mean total household incomes (Kshs. 000)[7]	64.60	74.00	55.90
	(78.30)	(87.60)	(67.90)

Figures in parentheses are the standard deviations. Hheads -refers to household heads.

Source: Survey, 2004

[6] To facilitate comparative analyses across income groups and locations in the study, livestock ownership was aggregated into a single measure, Cattle Equivalent Units (CEUs) computed as mean price ratios of other livestock relative to that of cattle, cattle = 1, sheep = 0.10, goat = 0.12, pig = 0.07, chicken = 0.02.

[7] All income figures in Kenya shillings, 75 Kshs = 1 US Dollar.

The household heads in the study areas appear to be mainly middle-aged. The household characteristics further reveal that about 68% of sampled households in the study locations are male-headed households.

Central Maragoli location appears to have a higher proportion of household heads with secondary and above education level as compared to Shirugu location. But it can be noted that household heads with secondary and above level of education are few (38.4%), an even fewer number (14.8%) have above secondary education in both locations. The majority of them (61.6%) seem to have primary and below level of education. This implies that only a small number of them can take up lucrative opportunities in the formal labour markets. The mean of years of formal education of household head was 6.7 and 6.4 in Central Maragoli and Shirugu location correspondingly.

Shirugu location also has relatively large household sizes as compared to Maragoli. This appears to follow the land holding patterns in the two locations. The mean land ownership[8] in Shirugu (4.88acres) is more than four times in Maragoli (0.925acres), an indication of meager natural capital base (land) in Maragoli. The value of households' assets, computed as the sum of value of machinery, equipment and non-residential buildings owned by households is also much higher in Shirugu than in Maragoli location. This is further demonstrated by the difference in livestock ownership across the two locations. Livestock ownership besides showing store of wealth also indicates the income generating potential of the households.

[8] Mean land ownership was adjusted for rented and leased land in the case of Shirugu location. However, this was not done for Maragoli location because of minimal land market activities recorded.

The estimated annual total household incomes of Kshs. 73, 966 and 55, 855 for Shirugu and Central Maragoli locations respectively, are generally low. The computed mean annual per capita income figures were Kshs. 11, 275 and 9, 419 for the respective locations. This point out that majority of households in these locations can hardly meet their basic needs. Shirugu location also has higher mean household incomes as compared to Central Maragoli, though both locations lie in agro-climatic zones generally suitable for agricultural production.

4.1.2 Distribution of Household Assets by Income Quintiles

Table 4.2 below shows some mean characteristics of sampled households by quintiles.

Table 4.2 Mean households' assets by income quintiles (Pooled sample)

Variable	I	II	III	IV	V	Total
Land size (acres)	4.97	2.80	3.30	1.80	1.31	**2.84**
Household size	6.40	6.90	6.10	5.60	6.20	**6.24**
Age farmer (years)	51.00	49.00	46.00	46.00	47.00	**47.9**
Livestock units owned (CEUs)	3.80	2.20	2.20	1.90	1.80	**2.34**
Education years of household head.	8.50	6.70	6.30	5.50	5.80	**6.57**
% Female headed	21.00	28.00	28.00	40.00	41.00	**31.50**
% With salaried income	46.50	11.60	2.30	2.30	2.30	**13.00**
% With formal loans	16.30	2.30	21.00	9.30	6.80	**13.10**
% Using hybrid maize seeds	63.00	51.00	51.00	35.00	39.00	**48.10**
% Using fertilizers	65.10	51.00	47.00	47.00	41.00	**50.00**
Annual per capita incomes (Kshs, 000)	29.490	9.62	5.98	4. 02	1.77	**9.82**

Source: Survey, 2004

It can be noted that households in the top-quintile have higher values of physical (livestock and land) and human resources (capital). For example, mean land ownership is 4.97 acres in the top income quintile as compared to 1.31 acres in the lower quintile.

The top quintile also has better access to farm inputs such as improved inputs such as seeds and fertilizers (63%, 65.1%) as compared to (39%, 41%) at the bottom quintile. They are therefore better placed in overcoming productivity barriers to remunerative livelihoods at the farm level.

On the other hand, households in the bottom quintile have low access to assets such as credit and therefore may not invest in farm inputs (soil improvements) that are necessary due to repeated use and reduced fallow periods as a result of land shortage. The consequence is that they are trapped in low productivity, hampering their movement out of poverty.

Having a salaried income is also an important predictor that a household will fall in the top income category. It can be noted further that the mean per capita income in the top quintile is much higher (more than three times) any than other income group in the two regions. This suggests highly unequal income distribution in the two locations.

4.1.3 Access and Ownership of Assets by Gender of Household Head

Studies such as Marenya *et al.* (2004) have suggested existence of gender differential access to productive resources such as land and credit. Table 4.3 is an illustration of the distribution of some mean household characteristics and assets by gender of household head. Male headed households own more land (2.91 acres) as compared to their female counterparts (2.65).

Table 4.3 Some characteristics of sampled households by gender of household head (Pooled sample)

Variable	Gender of household head.	
	Female	Male
Land sizes (acres)	2.65	2.91
% Involved in land disputes.	14.00	9.20
Number of livestock (CEUs).	1.90	2.54
Household size	5.70	6.50
Age (years)	48.00	48.00
Years of formal education.	5.16	7.22
Value of total assets owned (Kshs, 00)	228.30	511.23
% Using fertilizers	35.00	50.00
% Using hybrid seeds	35.00	77.00
% Received formal loans	10.30	17.00
Annual per capita incomes (Kshs, 00).	85.02	112.97

Source: Survey, 2004

Taking the number of years of formal education to indicate access to education services, male-headed households also appear to have better access to education (7.22) as compared to the female-headed households (5.16). Ownership of non-land based assets in male-headed households is also more than twice that of female-headed household. Women-headed households have lower per capita incomes as contrast to the male–headed households. Low incomes among the female-headed households can be attributed to unequal ownership or access to productive resources such as land, credit and farm inputs. This seems to suggest that gender could be an important aspect in poverty profile in the two locations of study and appears to be as a result of differential access and ownership of productive resources.

4.1.4 Household Activities and Composition of Incomes

4.1.4.1 Crop Enterprises

In the study locations, subsistence crops mainly maize and beans intercrop had the highest land allocation among the crop enterprises. In Shirugu location, sugarcane was the chief cash crop produced although some farm households marketed excess maize produced. The farmers also produced other crops such as sweet potatoes, cassava, bananas and vegetables. In Maragoli, it was evident that high value crop production was already taking place. Many households were involved in the production of kales, tomatoes and bananas and preferred to buy maize (staple food) for home consumption. The chief cash crop in Maragoli region is tea and is mainly grown by middle-income and high-income households. Tables 4.4 and 4.5 below show the contribution of various crop enterprises to crop incomes by income quintiles and study locations.

Table 4.4: Share of crop enterprises in crop incomes by income quintiles, Maragoli location (%)

Income quintiles	N	Maize/beans	Banana	Sukuma	Tomato	Tea	Others
I.	22	29.0	27.0	13.0	9.0	17.0	5.0
II.	22	38.0	17.0	10.0	6.0	22.0	8.0
III.	22	39.0	15.0	6.30	11.0	21.0	8.0
IV.	23	52.0	18.0	5.30	0.0	12.7	11.0
V.	23	56.0	20.0	4.0	0.0	9.0	11.0
Mean	**112**	**42.0**	**21.0**	**7.0**	**6.0**	**17.0**	**7.0**

Source: Survey, 2004

Table 4.5. Share of crop enterprises in crop incomes, Shirugu location (%)

Income quintiles	N	Sugarcane	Maize/bean	Banana	Tomato	Others
I.	20	81.0	16.0	1.0	1.0	1.0
II.	21	67.0	23.0	1.5	0.0	8.5
III.	21	68.0	28.0	2.0	1.0	1.0
IV.	21	50.0	38.0	7.4	1.0	5.0
V.	21	24.0	64.0	4.5	0	8.0
Mean	**104**	**54**	**39.0**	**2.0**	**1.0**	**4.0**

Source: Survey, 2004

A close examination of the major cash crops in each region reveals that the higher income households in both regions were involved in comparatively higher cultivation of cash crops as opposed to the poorest quintiles. In Maragoli location, the contribution of tea to crop income is much higher (17%-22%) in the high income groups as opposed to only 4 % in the low-income group. Similarly, the share of income accruing from cash crop is much higher (81%) in the top quintiles as compared to just 24% in the bottom quintile in Shirugu location. However, the shares of maize and beans, the main subsistence crops, in crop incomes are much higher in the low income groups in both locations. This appears to be the cause of observed distribution of absolute crop income, which were much higher among the relatively wealthy households but declined down the income groups, with the poorest quintiles recording the lowest levels.

The poor income households appear to be trapped in low productive sector (using traditional crop varieties) due to their inability to expand the scope of farm activities mainly due to lack of farm inputs (see table 4.2) which respondents attributed to inaccessibility to credit. Access to extension services is also low (only 18% of total sampled farmers reported receiving extension in 2004) yet it is through the extension service that this group (low-income) can be made aware of high yielding crop varieties and modern farming techniques that are vital in increasing farm productivity. There is need to expand extension services delivery in the study locations. A comparison of absolute crop incomes in Maragoli and Shirugu location disclosed that the mean incomes were much higher in the latter (Kshs 31,219) as compared to the former (Kshs 14,554).

4.1.4.2 Composition of Household Incomes

An examination of differences in the share of household income accruing to various sources can provide information on how variations in asset endowments affect the livelihood strategies across income groups and locations. This can be useful in guiding policy on the kind of interventions likely to benefit specific groups and regions in the society. Tables 4.6 and 4.7 below show the household income portfolios by study locations.

Table 4.6 Share of income sources by income quintiles, Shirugu location (%)

Income quintile	Salary incomes	Business incomes	Transfers	Informal Incomes	Total off-farm income	Crop incomes	Livestock incomes	Per capita incomes (Kshs 0's)
I.	36.0	17.0	7.0	0	60.0	35.0	5.0	3488.5
II.	8.4	18.0	7.6	12.0	46.0	46.0	8.0	1095.1
III.	0	14.0	8.0	13.0	35.0	47.0	18.0	582.5
IV.	0	10.0	8.0	13.0	31.0	61.0	8.0	458.4
V.	0	5.0	12.0	14.0	31.0	53.0	16.0	164.0
Mean	**23.0**	**15.0**	**7.0**	**7.0**	**50.0**	**43.0**	**7.0**	**1127.5**

Source: Survey, 2004

Table 4.7 Share of income sources by income quintiles, Maragoli (%)

Income Quintile Group	Salary income	Business income	Transfers	Informal income	Total of Off-farm income	Crop income	Livestock income	Per capita income (Kshs 00)
I	34.0	9.0	20.0	9.0	72.0	16.0	12.0	244.55
II	22.0	10.0	12.0	14.0	58.0	20.0	22.0	92.07
III	4.4	2.1	9.3	14.0	30.0	50.0	20.0	58.95
IV	0	2.9	4.8	21.0	29.0	58.0	13.0	36.59
V	2.0	1.0	9.0	11.0	23.0	71.0	6.0	18.83
Mean	**23.0**	**8.0**	**15.0**	**14.0**	**60.0**	**26.0**	**14.0**	**94.19**

Source: Survey, 2004

The percentage share of off-farm income and its salary component in total incomes is highest in the high-income groups in both locations. Households in the top quintile derive the largest share of their incomes from wage earnings working mainly as civil servants (teachers. and clerks and administrative heads in local councils). Further examination also reveals that the top quintiles have the highest share of salary incomes and this is not a feature of the low-income groups. The share of salary incomes in total off-farm incomes is also largest in the top income groups. Marenya *et al.* (2003), in a recent study carried out in the land-scarce Madzuu location of Vihiga district to establish the role of education and non-farm income obtained similar results. Many of these households also indicated using off-farm income to finance farm investments.

The low-income groups derive a large portion of their off-farm incomes from unskilled informal labour activities (working mainly as farm laborers and bicycle transporters). Livestock sub-sector also appears to be much higher important in Maragoli than in Shirugu location especially among the relatively wealthy. The relatively wealthier households in the former location are opting for more intensified (zero grazed) production systems with improved breeds. reflecting the land scarcity (Bebe. 2003).

Crop income share is also lowest in the top quintile but increases down the quintiles and is highest in the bottom quintile. though the higher income groups had higher absolute levels of crop incomes. This shows that poor households (those in bottom quintile) in both regions rely mainly on farming and seasonal labour activities as their main source of livelihoods. As they practice rain-fed agriculture. their livelihoods may be particularly vulnerable to shocks such crop failures and other personal shocks such as malaria that respondents noted are prevalent in the study regions. However. access to off-farm income sources such as in self-employment and salary incomes can make them climb the income ladder to relatively well-off income groups.

Transfers are much higher in Maragoli than in Shirugu location, this seems to suggest rural households' dependence on social networks for their livelihoods. Studies such as (Evans and Ngau, 1991) have established the importance of these funds in furthering farm intensification and off-farm investments. However, the noted differences in income structures between the two locations seem to reflect differential access to factor and product markets (Barrett, 2001b).

In general, off-farm income has significant shares in household incomes in the two research locations. The percentage contributions were 50% and 60% for Shirugu and Maragoli locations respectively. The computed shares of agricultural (livestock and crop income) to off-farm income for Shirugu is in line with the 50:50 reported across sub-Saharan Africa region (Ellis, 2000; Freeman *et al.*, 2004). However, for Maragoli location, the results of this study seem to support Marenya *et al.* (2003) and Oluoch-Kosura *et al.* (2004) assertions that in regions with low per capita land holdings such as Vihiga district, farm production may only offer a modest opportunity as the basis for securing livelihoods even with intensification. This suggests that more and more people must necessarily be absorbed into the off-farm sector both at the local level and beyond if they are to escape poverty.

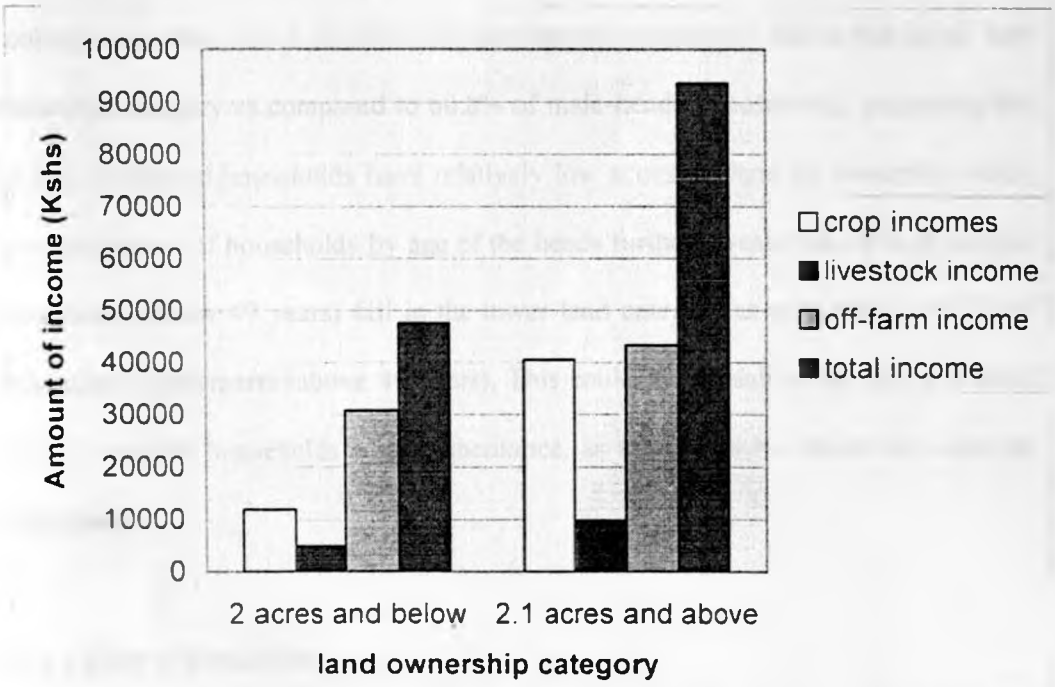
However, the resource poor face entry barriers to remunerative livelihoods in the off-farm sector (Ellis, 2000; Oluoch-Kosura *et al.*, 2004). Because of low level of physical and financial assets, they are unable to invest in self-employment and formal education beyond the primary level. The consequence is a downward vicious spiral that entraps them in poverty.

4.1.4.3 Incomes across Land Ownership Categories

To further illustrate the role of off-farm income in situation of diminishing land size, the study plotted the various incomes against two categories of land ownership. Figure 4.1 below shows income distribution across land ownership categories.

The distribution of per capita incomes by land ownership categories reveals that households with smaller parcels (below 2 acres) generally have low level of per capita income as compared to households with large land holding sizes. However, the incomes do not appear to exhibit a particular pattern across the land ownership categories.

Figure 4.1 Income distribution across land ownership categories (pooled sample)



Source: Survey, 2004.

Households (37.5% of sample) who own above two acres of land have higher values of crop, livestock, off-farm and total incomes as compared to those who own two acres and below (62.5% of sample). Comparisons across study locations reveal that 77 % and 23% of sampled households in Maragoli and Shirugu location respectively, fall in the lower

category. However, it can be noted that off-farm income has the largest share in total household incomes in both land ownership categories.

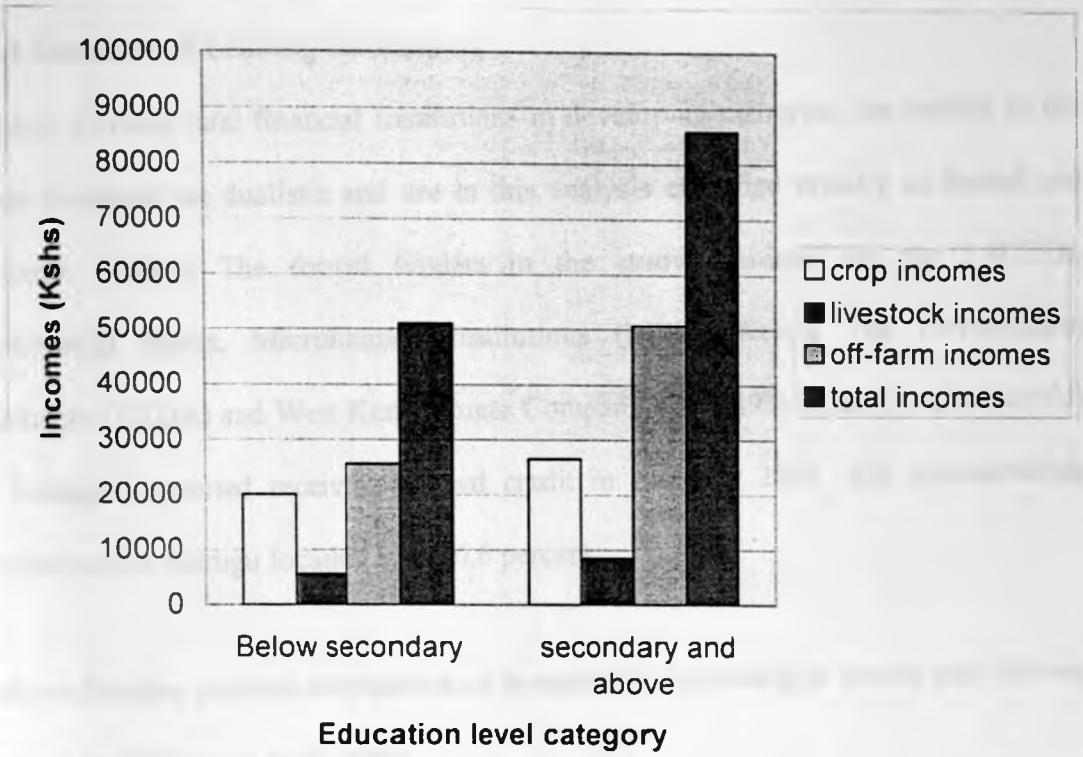
Off-farm income also has the largest share in total household incomes in the lower land ownership category. This further shows that as farm sizes continue to shrink among these farm households, there is need for policy interventions to facilitate access to off-farm income opportunities. In addition, the small land parcels also limit the expected returns to agriculture based livelihoods and consequently increases the relative returns to investment in human capital such as training that can increase the space of non-farm livelihood opportunities.

Looking at gender, about 66.2% of female-headed households fall in this lower land ownership category as compared to 60.8% of male-headed households, suggesting that the female-headed households have relatively low access to land by ownership status. An examination of households by age of the heads further reveals that 68% of younger households (below 49 years) fall in the lower land category as compared to 45.7% of their older counterparts (above 49 years). This could be a result of the fact that about 91% of sampled households stated inheritance, as the means by which they acquired owned land.

4.1.4.4 Role of Education

Figure 4.2 above shows the distribution of incomes by education level of household head. About 61% of household heads had up to primary level of education while 39 % had secondary or above education. Notably, households headed by individuals with secondary and above education had higher incomes under all income categories as compared to those with primary or below education.

Figure 4.2 Income distributions across education level categories (Whole sample).



Source: Survey, 2004.

The income structure suggests that those with secondary and above education have better access to income generating opportunities both off-farm and on-farm. However, poor households in the rural areas face financial entry barriers posed by high cost of secondary education hence are unable to invest in education beyond the primary level (Marenya *et al.*, 2003).

Further investigation reveals that 73.5% of female-headed households fall in this lower education category as compared to 54.5 % of male-headed households. This seems reflect presence of gender bias in access to education services and the resulting economic benefits.

4.2 Household Participation in Financial Markets in Study locations

4.2.1 Structure of Lending Institutions

Typical of most rural financial institutions in developing countries, the lenders in the study locations are dualistic and are in this analysis classified broadly as formal and informal lenders. The formal lenders in the study locations are the SACCOs, commercial banks, Microfinance Institutions (MFIs), Kenya Tea Development Authority (KTDA) and West Kenya Sugar Company. Only 17% of sampled households in Maragoli reported receiving formal credit in the year 2003. The corresponding proportion for Shirugu location was 10.6 percent.

Table 4.8 below presents information on households' borrowing in formal and informal lending institutions in study areas.

Table 4.8 Households borrowing in Formal and informal lenders in Maragoli and Shirugu locations

Lending institution	No. of households in Maragoli	No. of households in Shirugu
SACCOs	5 (31.6)	5 (45.0)
Commercial Banks	1 (5.3.0)	2 (18.0)
KTDA	11 (57.8)	-
KWFT	1 (5.3.0)	-
West Kenya Sugar	-	4 (37.0)
Private money lenders	1 (14.5)	2(25.0)
Relatives	2 (28.5)	5(62.5)
Neighbours	2 (28.5)	-
Local welfare associations	2(28.5)	1(12.5)

Figures in parentheses refer to valid percentages among formal and informal loans respectively and therefore cannot add up to 100%.

Source: Survey, 2004

Approximately 6.3 % and 7.7% of sampled households reported receiving credit from informal sources in the two research locations respectively, though they stated this to be the most important and easily accessible source. The recorded low participation in

informal credit markets can be attributed to unwillingness to divulge borrowing information. This can be attributed to the perception of borrowers that informal loans infer high degree of inferiority (Elhiraika and Ahmed, 1998).

It can be noted that the formal lending institutions outreach in the study locations in terms of borrowing is low. Over 70 % of sampled households stated that they had no access to formal loans. While KTDA is an important lender of formal credit in Vihiga, it only lends to farmers cultivating tea and the lending is in kind (fertilizers). The loan is recovered when farmers make tea deliveries to the factories. West Kenya Sugar Company on the other hand operates in Kakamega region and only lends to sugarcane farmers.

Although various MFIs such as K-rep, Small and Micro-Enterprise Program (SMEP), Pride Africa are reportedly operating in the two districts of study, the only reported borrowing was from Kenya Women Finance Trust (KWFT). While these institutions are expected to circumvent the bottlenecks of formal lending institutions and spearhead financial services delivery to the poor, the results of this survey show that their outreach is still low. A KWFT credit officer interviewed admitted that due to poor infrastructure in the remote areas, most of them were forced to operate "along the tarmac". Improving infrastructure in the rural areas could improve these institutions outreach to remote and far away villages. The table also shows rural SACCOs as evolving to be a very important source of credit for the rural households.

The informal lenders in the two locations of study consisted mainly of relatives, private moneylenders, neighbors and local welfare associations.

4.2.2 Nature of Loan Transactions

This section describes the conditionalities (collateral requirements), uses and repayments and interest rates of loans obtained by respondents in the study areas. These characteristics limit access to loans advanced by the financial institutions and the subsequent use to which households can put them.

4.2.2.1 Purposes of Loan and Product Range

The purposes of obtaining loans seem different for formal and informal sources. The uses of formal loans appear restricted to investment in education (15.8%, 54%)[9], farm inputs (63.2%, 36%), business and buying land (21%, 10). Formal loans are mainly tied to investment in income generating projects so that there are considerable costs involved in diverting funds to other uses. The tying of formal loans to income generation also enables the borrower to repay the loan. However, different formal lending institutions lend for different purposes with KTDA and West Kenya Sugar Company lending for farm inputs. Key informants interviewed attributed low farmer participation in these institutions to unclear credit terms (transactions not transparent) as the farmer may not know the actual cost of borrowing. While the credit channeled through the product market is considerable especially in Maragoli location, a further examination revealed the financial product range to be relatively narrow. These lenders only targeted specific crop enterprises and the financial products are not designed for long-term investments or to finance new ventures.

The arrangement also limits the range of marketing outlets that farmers can pursue especially if prices offered by these contracts are not competitive (Pederson, 2003). The feeling among the key informants is that these lending institutions should explicitly

[9] Figures here refer to percentages in total advanced loans in Maragoli and Shirugu locations respectively.

state their interest rates so that potential clients (farmers) can make informed decisions to borrow the loans offered in kind. The product prices also need to be continually reviewed to reflect the prevailing market conditions so as to be competitive. These would increase farmer borrowing and minimize tendency to violate contracts for more competitive prices offered in alternative marketing channels.

There is further difference in target groups; MFIs such as KWFT mainly reaches out only to businesswomen (clients). As such, prospective male clients cannot access financial services offered by the institution. A KWFT credit officer interviewed stated that because of poor legal framework, they had costly litigations and endlessly dragging cases in court especially on defaulters contesting assets appropriation. This has discouraged lending to new clients. He also noted that the public administration was very uncooperative when it came to such cases. The MFIs are then forced to ration credit and limit access and product ranges to those who could afford to raise collateral. However, the MFIs loans are available on short notice and they also offer additional training on business skills and financial management.

The Micro Finance Bill drafted by Central Bank of Kenya that seeks to license, regulate and supervise MFIs is yet to be passed. There is need to enforce the legal framework to ensure compliance beyond disputes. The rural SACCOs offer loans of adequate amounts and they can be extended for various uses at low interest rates (of about 11% per annum). The amount one can borrow is based on the amount of shares one owns but the funds cannot be accessed at the borrowers discretion. An official interviewed acknowledged that they sometimes run out of loanable funds especially when schools re-open because almost all members want loans to be able to pay school fees for their

children. However, membership to these institutions is based on monthly contributions hence cannot be accessed by the poor.

On the other hand, informal loans were put to diverse uses including traveling, health purposes and household expenditures (consumption). A remarkable pattern emerges; the informal loans are used mainly for consumption smoothing (dealing with seasonal demands of expenditures). On the other hand, the formal loans are used to augment physical (buying land and farm inputs), human capital (education) and in off-farm activities thus enhancing the income generating capacity of participating households thereby could be important in reducing their vulnerability to poverty.

4.2.2.2 Collateral Requirements

From the survey results, collateral requirements of the institutions can be identified as the most important feature limiting smallholders' access and choice of credit institution. Collateral is often demanded as a security for money advanced because investments are costly and risky yet it is difficult to obtain information about potential borrowers especially in far-flung areas. The formal institutions in the study areas demanded collateral ranging from land (5.3%, 27%), cattle (5.3%, 0), co-signatory (5.3%, 0), shares (21.1%, 45%) and agricultural produce (63.2%, 27%). These collateral requirements are beyond the reach of most poor rural households in the study areas. These households own small parcels of land, have fewer livestock units and depend on farming as the main source of their livelihood. As a result, they are not able to borrow to increase their productivity; even where they apply for loans they are denied. Furthermore, most of sampled households (over 50%) do not have land title deeds. Those who have title deeds are not willing to apply for loans for fear that their land will be appropriated in case of default.

A further probe on why some of respondents have not applied for loan from any formal source in the last five years revealed that many of them were unable to meet the stringent requirements (53.1%, 42.7%). Self-selection was also observed among the relatively richer/wealthier households who could easily put up collateral for formal loans. Boucher and Carter (2001) refer to this phenomenon as risk rationing and occurs when lenders because of asymmetric information shifts too much contractual risks to the borrowers that they voluntarily withdraw from the credit market. A further 24% and 27% of respondents in Maragoli and Shirugu locations respectively reported being unaware of any formal credit sources. This implies that some households may not know the requirements of the formal lenders, pointing to the need for education campaign to create awareness about credit. In contrast, the informal loans received in the study locations bore no collateral requirements, which suggests that lenders in this sector rely on the personal knowledge of the borrowers to assess their credit worthiness.

4.2.2.3 Loan Duration and Repayments

The informal loans received were short-term with repayment periods ranging from one to three months as opposed to the formal loans, which were medium term ranging from 1-3 years. The MFIs have stringent repayment terms such as requiring weekly deposits hence is unsuitable for agricultural production. Although formal loans advanced bore interest rates in the range of 10-24% per annum, most informal loans did not command interests. The highest interest rates in this informal sector were recorded with the private moneylenders who charged as much as 33% on a quarterly basis. Improved smallholders' access to formal loans could provide them with cheaper alternative source of credit.

4.2.2.4 Preference for Formal and Informal Loans

Sixty percent of formal borrowers in Shirugu and 15.8% in Maragoli stated that they preferred the formal credit source because of higher amounts of credit available. The data showed that the formal loans amounts were much higher than the informal ones[10]. However, borrowers from informal market disclosed that they preferred the sources because they are easily accessible and the application procedure is less cumbersome (57.1%, 87.5%) as compared to formal sources. The transaction costs involved in acquisition of formal loans are also disproportionately higher given the small amounts of loans sought by poor households in far distant and remote villages.

[10] Difference in means tests conducted indicated the formal loans to be significantly greater than the informal loans in both regions. The differences were significant at 1% and 5% in Shirugu and Maragoli location respectively.

4.3 Financial Services Demanded by Farm Households

4.3.1 Credit Services Demand by Households

Since the study also sought to establish financial products demanded by farm households, the respondents were asked to name the use to which they could put extra unit of credit if it were available. Table 4.9 below summarizes the kind of financial services demanded by farm households in study locations.

Table 4.9 Financial products demanded by households in Maragoli and Shirugu locations

Use of credit	No. of households in Maragoli location.	No. of households in Shirugu location.
Pay school fees	4 (3.6)	7 (6.7)
Off-farm business	43 (38.4)	36 (34.6)
Farm inputs	13 (11.6)	28 (26.9)
Buy land	37 (33.0)	18 (17.3)
Buy cattle	-	11 (10.6)
Others	1 (0.9)	4 (3.9)
Total	**112 (100)**	**104 (100)**

Figures in parentheses are the percentages of households in each category.

Source: Survey, 2004

The use to which additional funds could be put seem not to vary much across the study locations. But it can be noted that a higher percentage of households in both locations reported preference to use the credit for off-farm business investments (43% and 36% in Maragoli and Shirugu location respectively). A higher percentage of households in Shirugu also expressed willingness to use extra funds for land related investments than in Maragoli location (56% and 50 respectively). Nevertheless, a higher percentage (33%) expressed that they would use the credit to buy more land. This may be anticipated given the severe land-constraints felt in the region, that limit space and returns to farm investments but increases returns to off-farm investments.

4.3.2 Savings Services

Savings mobilization has often been seen as a critical component in improving access to credit in the rural areas. This way, households can pool money accumulated in good times and draw on to invest in physical assets and other household assets.

In the survey locations, approximately 26.8% of respondents in Central Maragoli and a corresponding 26.5% in Shirugu have access to savings services with formal institutions. About 41% and 52% of the savings accounts were held with commercial banks while the rest of the accounts (59% and 48%) were held with the Post Bank, in the two locations respectively. These results show the Post Bank to be a very important savings institution for poor rural households. This can be attributed to its accessibility and low service charges. However, the institution does not offer credit facilities. Perhaps a repeal of legal and regulatory framework is necessary to encompass this.

Approximately 63.1% and 86.4% of respondents in Shirugu and Maragoli correspondingly, disclosed that they could not hold savings accounts with formal institutions because they had little cash, which they preferred to keep 'under the pillow'. However, it is worthwhile to note that while some MFIs have been able to mobilize savings through the group savings system, the existing regulatory system does not permit the MFIs to lend the funds mobilized through savings. A repeal of this law and streamlining the operations of the micro finance organizations is necessary to enable these households access these savings instruments.

4.4 Results of Econometric Analyses

In this section, the study employs regression models to establish the structural relationships between various variables and the dependent variables (the household per income and household participation in credit markets).

4.4.1 Double-Log Results of Determinants of Household Per Capita Incomes

The table below presents the results of analysis of the determinants of household incomes in the study areas.

Table 4.10 OLS results of determinants of household per capita incomes

Variable	Co-efficient	Standard error
Constant	8.781	0.899
Gender	0.199	0.1333
Log Age of Head (years)	0.3422	0.217
Primary and below	0.1807	0.2042
Attended secondary	0.3801*	0.230
Completed secondary and above	1.066***	0.244
Log Non land-based Assets	0.00075	0.0005
Log land cultivated	0.2533***	0.0528
Log value of livestock	0.0004**	0.0002
Log household size	-1.039***	0.1414
Log dependency ratio	-.0002	0.0002
Adjusted R^2	0.33	
$F_{10, 205}$	11.71***	
Log-likelihood	-271.46	

a. Dependent variable = natural log of household per capita income.
Primary dummy= 1, if household head has primary and below level of education, 0 otherwise.
Attended secondary dummy=1 if household head attended but did not complete secondary, 0 otherwise.
***, ** and * denotes significance at 0.01, 0.05 and 0.1 respectively.

Source: Survey, 2004

The factors that influence the amount of per capita household incomes are; the household size, land size held, value of livestock kept and whether the household head

attended secondary but did not complete or has complete secondary and above education level (as indicated by the dummies).

The co-efficients of land holding size is positive and significant, meaning that access to land is an important determinant of livelihoods in the rural areas even where land is very scarce. The household heads' education level (human capital), livestock holdings are positive and significant in influencing household incomes in study locations. Investments in these kinds of assets will go along way in improving household well-being in study areas. Particularly that public investment in education, beyond secondary level is necessary in rural development efforts if households are to escape poverty (Alemayehu *et al*., 2001).

The co-efficient of household size is negative and significant. While increased physical returns are expected from larger households due to size of the labour force, the observed negative sign may imply increased demand and pressure on the limited resources of the household in meeting their various needs as compared to smaller households. Studies such as Oyugi (2000) posited that a higher percentage of members of such households are composed of children.

Although the co-efficient of gender, dependency ratio and age of household head have the expected signs, the model results show these relationships to be statistically insignificant. The insignificance of the gender variable does not necessary mean that gender is not an important factor in poverty profile, rather the differential access to productive resources such as land and education seem to be of more weight. The joint significance test for the explanatory variables as shown by the F-statistics is also significant at 1%. Unfortunately, regional dummies could not be used due to high correlation with the land ownership variable.

4.4.2 Factors Influencing Likelihood of Participation in Formal Credit Markets

Table 5.1 below presents the results of analyses of determinants of likelihood of households' participation in formal credit markets. The factors that influence likelihood of participation in Maragoli location are level of education, land size, having savings account and off-farm income. For Shirugu location only education level and amount off off-farm income positively influenced likelihood of participation.

Table 4.11 Logit likelihood estimates of determinants of households' participation in formal credit in Maragoli and Shirugu locations

	Maragoli[a]		Shirugu[a]	
Variables	Beta	Std errors	Beta	Std error
GENDER	0.241	0.677	0.969	1.208
	(0.356)		(0.802)	
HSESIZE	0.150	0.133	0.037	0.133
	(1.119)		(0.281)	
EDUCYRS	0.248	0.125	0.423	0.180
	(1.979)**		(2.354)**	
LANDSIZE	0.695	0.300	-0.076	0.104
	(2.314)**		(0.731)	
TOTASSETS	0.209E-05	0.300E-05	-2.44E-04	0.378E-05
	(0.070)		(-0.647)	
SAVEACC	1.193	0.628	1.245	0.901
	(1.899)*		(0.900)	
OFFFARM	0.111E-04	0.707E-05	0.121E-04	0.617E-05
	(-1.623)*		(1.917)**	
Constant	-5.458	1.564	-7.247	2.098
	(-3.489)		(-3.454)	
McFadden R^2	0.262		0.400	
Log likelihood	-37.59		-21.03	
Model chi-square	26.79***		28.13***	
Correct predictions	83		81	

a. Dependent variable if household received formal loan =1, 0= otherwise.
Figures in parentheses refer to the t-statistics.
***, **, and * denote significance at 0.01, 0.05 and 0.1 respectively.
E= E+ve or E–ve means the co-efficient is multiplied by 10 raised to the power of the figure.

Source: Survey, 2004

4.4.3 Factors Influencing Extent of Participation in Formal Credit Markets

Table 5.2 below shows the Tobit regression results of determinants of extent of participation. The results indicate value of total assets owned (value of livestock and other physical assets), education level, presence of formal savings account and land holding size to be significant in influencing the amount of credit received in Maragoli location. In Shirugu, the education level of household head, amount of off-farm income and holding of formal savings account influences amount of loan received.

Table 4.12 Tobit likelihood estimates of extent of participation in the formal credit markets in study locations

	Maragoli[a]		Shirugu[a]	
Variables	Beta	Std errors	Beta	Std errors
GENDER	-5640.96	9615.02	13490	16502
	(-0.59)		(0.82)	
HSESIZE	3232.14	2048.72	779.32	1936
	(1.58)		(0.40)	
EDUCYRS	3575	2035	7576.13	2798
	(1.76)*		(2.71)***	
LANDSIZE	8365.69	3575.26	-1055.95	1497.42
	(2.34)*		(0.71)	
AGEFAR	-155.24	411.58	38.32	528.70
	(-0.38)		(0.07)	
TOTASSETS	0.09	0.03	-0.042	0.04
	(3.60)***		(-1.04)	
SAVEACC	23398.56	9519.93	21083	12963
	(2.46)*		(1.63)*	
OFFFARM	-0.113	0.87	0.18	0.07
	(-1.295)		(2.58)***	
Constant	-82481	31176.94	-123292	41667.33
	(-0.59)		(-2.95)	
LRI	0.084		0.084	
N	112		104	

LRI= Likelihood Ratio Index
Figures in parentheses are the t-values. *** and * denote significance at 1% and 5% respectively.
Dependent variable = the amount of formal loan received by household in Kshs.

Source: Survey, 2004

4.4.4 Discussion of Factors Influencing Likelihood and Extent of Participation in Formal Credit Markets

Education level of head positively influences households' likelihood and extent of participation in formal credit in both locations. This can be explained by the fact that more educated households are more knowledgeable and are aware of the existing credit facilities and merits of credit use as opposed to less educated households. They are therefore more likely to seek credit for various productive uses.

Amount of off-farm income earned by households affects their participation differently in the two study locations. In Maragoli, off-farm income variable is significant and affects both likelihood and extent of participation negatively, implying that most of households with more off-farm are likely to meet their investment needs (mainly on-farm on the small land parcels) without recourse to borrowing. Furthermore, high amount of off-farm income is likely to reduce the need for higher amounts of advances. In Shirugu, this variable influences participation positively because most of the loans received were put to non-farm uses and the lenders are likely to lend to borrowers' who have ability to meet repayment obligation. Amount of off-farm income received by a household is a good indicator of its repayment ability.

Possession of formal savings account variable is found to have a positive effect on households' participation in formal credit in the Maragoli area. The presence of formal savings account may mean that lenders have more financial information on the potential borrower thus effectively narrowing the information gap common in credit transactions. On the extent of participation, the variable is positive and significant in both locations. This implies that mobilization of savings in rural areas is a major step in improving likelihood and extent of participation in credit market in rural areas.

The effect of gender of the household head is statistically indiscernible in determining likelihood and extent of participation in credit markets in both locations. However, descriptive analysis in Table 4.3 reports a higher proportion (17%) of male-headed households receiving formal credit as compared to 10.3% of their female counterparts. This may imply that ownership or access to productive resources such as land and education are much more important in influencing likelihood and extent of participation in credit markets than gender *per se*.

Acreage of land owned by farm household is significant and positively influences their participation in formal credit market in Maragoli but not in Shirugu location. While this is supportive of the fact that land has conventionally been the most important collateral required for advancement of agricultural credit, it has serious implications for credit policy since average land holding in Maragoli region is only 0.925 acres and a higher proportion of formal credit was given for purchase of farm inputs. On one hand, this implies that land redistribution policy may be necessary to enhance access to credit. A more feasible alternative (would require less resources and political will) is that collateral substitutes or alternative credit arrangements such vertical integration with product markets such as in Maragoli must be pursued in efforts to improve access to credit especially for investments on-farm. However, the co-efficient of landholding size is insignificant in Shirugu location, perhaps because land is not yet a binding constraint and lenders focus on other variables such as amount of off-farm income that reflect the existence of repayment capacity.

Non-land based asset variable does not seem to have influence on household participation in credit markets in both regions. However, the value of total assets owned influenced extent of participation positively in Maragoli meaning that the amount of

loan received increases with the value of non-land based assets owned by farm households in the region. Asset ownership is important since it may determine, via the supply side. whether an individual will secure credit after meeting collateral requirement (Binswanger *et al.*, 1989). This inconsistency in regions seems to arise out of the fact that most of assets owned by smallholders are of agricultural nature but in study area of Shirugu such activities are carried out by machineries from contracting companies such as West Kenya Sugar Company.

The age of household head has no effect on either the likelihood or extent of participation in credit markets in both locations. This means that other variables associated with advancement in age such as asset accumulation may be much more important. Household size variable's effect in influencing likelihood and extent of participation in formal credit markets in both locations is statistically indiscernible. Other studies (such as Diagne and Zeller, 2001)) have also found the variable to be insignificant in influencing participation in Malawi.

Main occupation of household head (MOCCUP) variable was dropped from the logistic model for determinants of likelihood of participation in formal credit markets because of high correlation with OFFFARM variable yet the latter gave the best fit.

In general, the results of the analyses of likelihood and extent of participation in credit markets conform to results of other studies (Elhiraika and Ahmed, 1998) that have shown that financial programs should be designed to incorporate region specific issues. Blanket recommendations if any for credit programs are most likely to ineffective in reaching the targeted groups in different areas.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

The study sought to establish a clear-link between the micro-level activities in which the rural dwellers engage and the role of rural financial markets. The study further examined the range and factors that influence the likelihood and extent of participation in the credit markets. The data for the study was obtained from two locations from the neighboring districts of Vihiga and Kakamega, purposively drawn against distinctively different per capita availability of land and market access. Data was collected via use of household level questionnaires and key informant interviews. Analysis was done using descriptives (such as means, percentages and quintiles) and regression analyses.

The results of descriptive analyses of the income structures revealed that the share of off-farm income in total household income is relatively higher in the land-constrained Maragoli location (Vihiga) than in land abundant Shirugu location (Kakamega). The percentage shares were 60% and 50% in the two locations respectively. Further analysis of the income distribution indicated that the low-income groups (those lying in the bottom 20% percentile) in the study areas depend mainly on food-crop production and seasonal wage labour activities for their incomes and are therefore likely to be vulnerable in face of personal (such as illness) and covariate shocks such as droughts and floods. On the other hand, the wealthier with better access to productive resources (such as land, human capital and farm inputs) are able to combine on-farm production with off-farm income mainly from the formal employment sector to escape poverty.

The analysis of income distribution also revealed that while increase in land productivity is important in securing improved livelihoods for rural dwellers, it may not be sufficient to enable them escape poverty. Growth of the non-farm sector, especially

in the formal and self-employment, is necessary in the rural areas and must be particularly emphasized among the low-income group who also own less land. The distribution of the various categories of income across education levels also revealed that human capital is vital in harnessing both on-farm and off-farm investments. The results of the double-log analysis also revealed that size of land cultivated, the human capital of household head (education level) and value of livestock assets are significant in influencing the household per capita incomes in study areas whereas household size influenced the incomes negatively. This implies that investments in these assets are necessary in raising living standards in the rural areas. However, family planning programs to control upsurge in population must also be incorporated in rural development policies.

While access to credit may play a vital role in facilitating these on-farm and off-farm investments, the formal institutions outreach in the study areas is low. Only 13% of the total sampled population had accessed formal credit for various uses. The corresponding participation in informal credit market was 7.1%. This low borrowing from formal credit market was attributed to stringent requirements of the formal lenders while that of the informal lenders was attributed to farm households' heads unwillingness to divulge borrowing information. The range of financial services offered was also found to be narrow with most of the formal financial institutions specializing in certain products mainly for productive purposes such as for particular cash crops. This means that poorer households interested in certain kind of investments are unable to access credit for such uses.

The informal loans were mainly put to consumption smoothing. What the sampled farm households appeared to be interested in is the ability to access large amounts of loans on

short notice, with little or no collateral, low interests rates and most of these loans are likely to be demanded for non-farm investments as opposed to farm investments. Approximately 26.8% of respondents in Central Maragoli and a corresponding 26.5% in Shirugu had access to savings services with formal institutions, with nearly 60% having accounts with commercial banks. The majority of sampled households appeared to be interested in savings instruments that can be easily accessed and that attract low service charges given the low amounts of deposits made.

The estimated Logit and Tobit models for likelihood and extent of participation in formal credit markets indicated that education level of household head, possession of savings account, and land size were significant in influencing the likelihood positively in Maragoli location. These variables together with value of total assets owned were also found to positively influence the amount of credit received in Maragoli. However, the co-efficient for the amount of income was negative and significantly determined likelihood and extent of participation in Maragoli. For Shirugu location, only the education of household head and total amount of off-farm income variables were significant in explaining likelihood and extent of participation in formal credit markets. In addition, presence of formal savings account was found to also positively influence the amount of credit positively in this location.

5.2 Conclusion

The study has revealed that majority of rural poor continue to depend heavily on land-based agriculture (productive land), even in regions with severe land constraints such as Vihiga. The immediate course of action must then lie in increasing the productivity of the weak natural resource base (primarily soils). In the circumstance, investments such as in mineral fertilizers and high yielding seed varieties are indispensable yet evidently lacking in the study locations, especially among the relatively poor households who also own less land. This indicates a major role of farm credit in facilitating access to these farm inputs. But these inputs must also be combined with viable and profitable investments opportunities such as in high value horticultural crops and other services such as extension through which these low-income groups can gain knowledge but also evidently currently lacking. Lastly, these efforts to secure improved farm productivity must also look at improving access to product and input markets.

These on-farm investments must necessarily be integrated with off-farm investments, especially in areas with severe land constraints such as Maragoli location, if the poor households are to generate sufficient incomes to escape poverty. This means that while access to credit is particularly necessary to enable the low-income groups adopt modern high yielding seed and crop varieties and fertilizers, the evidence on income structures points to necessity that promotion of a broad array of financial services that are suited to consumption and income diversification needs, is more likely to achieve poverty reduction goals in the rural areas. Investments in human capital also had higher returns, but such investments are high and payback period is too long for poor households to undertake or trade-off for their present income and consumption needs. This means initiatives to improve access to human capital such as free education and support of

children from poor families through bursary funds and training are central and must be incorporated in rural development goals by the public sector.

Examination of the lending institutions such as the MFIs also appears to suggest scope for the promotion of diverse financial services but these are currently limited to certain clientele. The government must create favorable institutional framework such as by enacting laws to enforce contractual agreements beyond dispute and expanding infrastructure, so as to smoothen operations of these financial institutions. To improve access and participation in broader financial programs, the design of the programs need be largely region specific taking into consideration local resource conditions as revealed by estimation of credit market participation in the study areas. However, level of education and possession of a formal savings account have significant positive influence on participation of rural households in formal credit markets. The more educated households are more aware of and can take advantage of existing opportunities. Emphasis must also be given to savings mobilization and removal of the entry barriers in accessing formal credit such as collateral requirements. Collateral substitutes such as group guarantee system and vertical integration through products markets (for high value crops) should be pursued in overcoming this barrier. The latter accounted for a significant proportion of agricultural credit received in Maragoli location.

Formal savings programs that aim to meet the demands of the poor have to respond to their savings needs and preferences, which appear to be more consumption-oriented, secure and easily accessible (liquidity) rather than profitability. Therefore long-term viable and integrated institutions that participants trust, offer saving products with different maturities and maintain low transaction costs for depositing and transacting

savings to attract potential savers. are needed in the rural areas. While insurance services are equally important especially in consumption smoothing and can be judiciously integrated with savings. this wasn't explored in the study, an examination of the households demand for insurance services is needed.

Lastly. it must be emphasized that since demand for credit is essentially a derived demand. promotion of sustainable and innovative finance programs must also be complemented with strategies to create viable and profitable investment opportunities in the rural areas. It was evident from the study that most of the poor households are mostly engaging in substance activities and profitable activities that can be adequately financed to ensure maximum benefit to farmer and to enable loan repayments are lacking. In this regard. improving access to infrastructure as demonstrated by differential analysis of income structures in the two locations and decentralization are necessary to spur broad-based development in the rural areas.

5.3 Recommendations

From the study results, the following recommendations were made: -

- Initiatives to improve access to credit should be household specific. In this regard, credit programs that target specific households, for example those owning less than half of an acre of land and using collateral substitutes may be necessary to provide credit for off-farm investments in land-constrained regions such as Vihiga. Micro finance pioneers such as BRAC in Bangladesh have successfully targeted credit to rural households owning less than 0.5 acres of land but focusing on off-farm enterprises. The MFIs can also offer training in business and financial management thus facilitating entry into off-farm sector.
- Promotion of educational services via extension agents would most likely improve access to credit in the rural areas such as the study areas. These can take the form of credit sensitization campaigns whereby the institutions credit officer are directly linked to the community through small offices where they can get full information on credit terms and conditions and trained on credit use and management.
- Savings mobilization is also likely to improve access to formal credit. While this is already being undertaken by MFIs, there is need to improve this by promotion and strengthening of member-based and member-controlled institutions such as cooperatives and group-based approaches. Streamlining operations of financial institutions through legal provisions is also imperative to protect the mobilized funds.
- As observed in Maragoli location, vertical integration with product market seems to have good potential in supply of agricultural credit particularly along high value commodity lines. However, a preliminary assessment in the study revealed that the interest rates on these loans are unknown and therefore does

not allow the borrowers to make informed decisions. Furthermore, the suppliers do not open doors to negotiations on review of commodity prices to reflect prevailing market conditions. Further assessment is required to establish bottlenecks in the process so as to improve credit flow through this channel.

- While in the current study, distance to nearest the nearest source of formal credit was found to be insignificant in influencing households' participation in formal credit markets, expanding the physical infrastructure in rural areas must form an essential component of initiatives to facilitate expansion and outreach of the formal lending institutions to remote villages. This will reduce transactional costs associated with borrowing and monitoring of credit and further open up the areas such as Maragoli location by creating profitable opportunities for investments and ensuring access to products markets.
- Given this broader role of rural financial markets in poverty reduction, it is not immediately clear from this study which investments are likely to result in optimal returns to credit/capital invested. Therefore a study that evaluates the marginal effects of access to credit on various categories of household incomes and welfare aspects is needed in Kenya. This study was unable to evaluate this because of insufficient observations on households' access and participation in credit markets (See Diagne and Zeller, 2001). Sample stratification along participation in credit programs may be necessary in study design so as to give substantive empirical results.

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Appendix (i) Goodness of Fit for the Tobit Model

1. Maragoli Tobit model for extent of participation in credit markets

LnL= -241. 09

$\ln l_0$ = -263.31

LRI = 1-(-241/-263.31)

LRI = 0.0844

2. Shirugu Tobit model for extent of participation in formal credit markets

lnL = -141.7

$\ln l_0$ = -154.80

LRI = 1-(-141.7/-154.8)

LRI = 0.0836

Appendix (ii). The household level questionnaire

THE SURVEY INSTRUMENT FOR THE ROLE OF RURAL FINANCIAL MARKETS IN REDUCING POVERTY, RISKS AND VULNERABILITY AMONG THE RURAL POOR: THE CASE OF KAKAMEGA AND VIHIGA DISTRICTS.

DEPARTMENT OF AGRICULTURAL ECONOMICS, UNIVERSITY OF NAIROBI.
(To be administered only to the household head).

1.0 IDENTIFICATION

1.1 Enumerator's name _____

1.2 Respondent's name _____

1.3 District _____ Division _____

Location _____ Sub-location _____

Village _____

1.4 Date _____ Start time _____ End time _____

A. HOUSEHOLD CHARACTERISTICS

A1. Gender of farm household head _____ 1 = Male 2 = Female

A2. Age of farmer _____

A3. Marital status of household head _____ 1 = Single, 2 = Married, 3 = Separated, 4= Widowed, 5 = Divorced

A4. Status of household's head residence _____
1 = Mud walled with thatched roof, 2 = Mud walled with corrugated roof,
3 = Wooden wall with corrugated roof, 4 = Stone walled with corrugated roof
5 = Stoned wall with tiled roof 6 = Others (specify)

A5. Education level of household head (yrs) _____ 0= no formal education, 1= primary, 2= completed primary, 3= secondary, 4= completed secondary, 5= tertiary college or university

A6. Main occupation of farmer? _____ 1= Farming, 2= trader, 3= civil servant, other=4 (specify).

A7. If main occupation is formal, please state working experience? _____

A8. When did you begin farming? (Year) _____

HOUSEHOLD DEMOGRAPHICS:

A9. How many members are resident on the farm? _____

A10. How many members are able workers? _____

A11. Number of household members who are 15 and below_____

A12. Number of household members who are 61 and above_____

A13. How many adult members (16-61yrs) do regularly take on employment outside the farm? _____

A14. Number of household members with skilled employment/_____

A15. How many household members have left home to go and look for work elsewhere ___

ACCESS TO EXTENSION AND HEALTH SERVICES:

A16. How many times in the last one-year were you visited by an extension officer? ____

A17. How many farmer-training/workshops have you attended in the last one-year? _____

A18. Over the last 5 years, would you say extension service provision has improved or declined _____?

State reason for your answer. _____

A19. What is the distance to nearest major market centre (Kms)? _____

A20. Mode of transport used (commodities) _____
1 = Walking, 2 = Bicycle, 3 = Carts, 4 = Lorries, 5 = Other (specify)

A21. What is the distance to the nearest feeder road? (Kms) _____

A22. What is the distance to the nearest health center? (Kms) _____

A23. What is the major health problem in this region? _____

A24. How would you rate your access to health care services? _____
1 = Good, 2 = Fair, 3 = Bad, 4 = Very good.

A25. What is the distance to the nearest veterinary officer? _____

B: HOUSEHOLD ASSETS

B1. Total size of land owned by the farm household (acres)_____(TOTALSIZE)

B2. How much land did you rent? (LANDRENT)
a. During long rains 2003 _____
b. During short rains 2003 _____

B3. How much land did you lease out during? (LANDLEAS)
a. During long rains 2003 _____
b. During short rains 2003 _____

B4. In the last 5 years have you sold any land? _____ (LANDSOLD)
State reason for selling land _____

B5. How was most of the land owned by household acquired?_____
1= Inheritance, 2 = Buying, 3 = Government, 4 = Clan, 5 =Lease, 6=Others (Specify)

B6. What rights do you have over most of the land you own? _____
1=Title deed, 2 = Customary rights, 3 = User rights, 4 = Other

B7. Is the land registered and who's name? _____ 1 = Yes, 2 = No
1=Same, 2 = Husband, 3 = Father, 4 = Brother, 5 = Other (specify)

B8. What control do you have over land owned? _____
1= full control, 2 =need permission, 3= do not know.

B9. What is the current land use? _____
1= cropped, 2 = Fallowed, 3 = Pasture4 = Woodlot, 5 = Napier grass, 6 = Other

B10. What is the current estimated value of your land? Kshs._____

B11. How do you gauge the fertility of your Land? _____ 1=Very fertile, 2 = Moderate, 3 = poor, 4=very poor, 5 = Not productive at all

B12. What is the change in fertility over the last 10 years? _____
1= improved a lot, 2 = Has improved a little, 3 =Has not changed much, 4 = Has deteriorated a little, 5 = Has deteriorated a lot

B13. What is the reason for the observed change in soil fertility over this period?___
1=changed fallow practices, 2 = Changed fertilization practices, 3 = Increased soil erosion, 4 = Improved soil conservation, 5 = Do not know why, 6 = Continuous cultivation, 7 = Soil normally poor, 8 = Other (specify)

B14. Have you had any disputes in the parcels in the past five years?
_____ 1=yes, 2= No

B15. How was the dispute resolved? _____

B16. If you had the means to expand your farm size, what would be the most appropriate measure in your case? _____1= clearing virgin land, 2= turning grazing land into cultivation, 3=Renting or borrowing, 4= buying land, 5= do not know.

B17. How much would it cost to rent an acre of land that is considered to be

of "good quality" for this area? (Ksh/per acre) _____

B18. In your opinion, what do you think needs to be done to improve access to land?

_____

MAJOR CAPITAL GOODS/ IMPLEMENTS IN THE HOUSE

B19	Item ID (See codes below)										
B20	Number of Items										
B21	How acquired (HOW ACQ) (See codes below)										
B22	Original purchase price (OR PSP)										
B23	Current Resale Price (CRPRICE (KSH)										

Codes: B19: 1 =Tractor, 2 =Pick-up Truck, 3 = Car, 4 = Cart (Animal traction), 5 = Motorcycle, 6 = Bicycle, 7=Wheelbarrows, 8=Jembes Forks, 9=Pangas/slashers, 10=Sickle, 11 = Rake, 12 = Spade, 13 = Radio, 14 =TV, 15 = Refrigerator, 16 = Gas or Electric stove, 17 = Stove, 18 = Sweater Sewing Machine, 20 = Cooking jiko, 21= Solar, 23 = irrigation equipment, 24= water pump, 25= torch, 26=others= specify

Codes: B21

1 = Inherited, 2 = Bought, 3 = Gift, 4 = Home made, 5 = Other (Specify)

B24. BUILDINGS OWNED BY THE HOUSEHOLDS:

Types of Building	Location	Year acquired or built	How acquired	Original construction cost	Approximate replacement or current cost

Type: 1= Store, 2 = Chicken house, 3 = Shop, 4 = Mill, 5 = Water tank, 6= Rentals, other= Specify

Location? 1 = on the farm, 2 = within the village, 3 = Outside the village.

C1. HOUSEHOLD SOURCES OF INCOME.

1. CROP ENTERPRISE (2002/2003) (Use codes below where necessary).

Crop Enterprise	Acreage Planted	For what purpose is the crop grown?	Quantity harvested (90 -Kg bags). other= specify	Quantity sold.	Where product sold.	Price per unit.	To whom was it sold	Did you use hybrid seeds=1, or local =2.	Did you use any fertilizer or pesticide? Yes=1, No=2.
	L.								
	S.								
	L.								
	S.								
	L.								
	S.								
	L.								
	S.								
	L.								
	S.								
	L.								
	S.								
	L.								
	S.								
	L.								
	S.								

Crop enterprise1 = Maize, 2 = Maize/Beans, 3 = Coffee, 4 = Tea, 5 = French beans, 6= sugar cane, 7= bananas, 8= sweet potatoes, 9= other specify.
L= long rains season, **S**= short rains
Where sold 1 = farm gate, 2 = market, 3 = Other (Specify). **For** Yes=1, No=2.
Purpose; 1= food crop, 2= cash crop, 3= both.

C2.VARIABLE INPUTS:

State which variable inputs you used in the last season in the crop enterprises.

uts	Crop enterprise	Number of units used Kgs/L	Price per unit	Type	Total amount	Distance to Where bought (kms)
ed						
rtilizer						
rmyard manure						
sticides/Insecticides						
lachines and nplements hired						
Other (Specify)						
otal						

Codes for inputs. Seed local =1. hybrid=2

Fertilizer CAN=1. DAP=2. TAP=3. other = 4 (specify).

LABOR USE (Man Days).

nterprise	Land preparation	Planting	Weeding	Fertilizer/pesticides application.	Harvesting	Total Man days
	F					
	H					
	F					
	H					
	F					
	H					
	F					
	H					
	F					
	H					
	F					
	H					

Where **F**-refers to family labor used, and **H**- refers to hired labor used.

Consider both short and long seasons.

C3. What is the average daily wage rate for general farm work in this region? _____

C4. Has price for seeds and fertilizers changed since you started farming?_____
1= no significant change. 2= prices have gone up. 3= prices have gone down, 4= do not know.

C5. LIVESTOCK ENTERPRISES.

Type	Breed	Number	Value	Total

Type: - Dairy=1, Beef=2. **Breed**: - local=1, cross=2, exotic=3,

C6. Did you slaughter any cattle/ sheep/goat last year_____?
State the value if it were sold (ksh). _____

C7. Any cattle sold in the last 12 months? _____ Yes=1, No =2.

State reason _____

C8. Total money earned from the sales? _____

C9. Did you make any purchases of new cattle in 2002/2003?

C10. How much did it cost you? _____

C11. During which months in 2002/2003 were you milking cows? _____

C12. Milk and Eggs produced.

Quantity	Units sold	Price per unit	Total sales (ksh)	Where sold	To whom
Milk					
Eggs					

C13. During which months was egg produced and sold? _____

C14. What were the costs for the dairy cows per month?

Veterinary drugs per month	Kshs.
Dipping costs per month	Kshs.
Other costs	Kshs.
Total	Kshs.

C15. Do you have a herd's boy? _____.
And how much is he paid per month or /day_____

C16. What was the cost for the poultry unit per month (Kshs)?
Feeds_____
Drugs costs_____
Other costs_____

C17. Income from use of oxen _____

C18. OFF-FARM SOURCES OF INCOME FOR THE HOUSEHOLD

	Nature of activity	Months engaged in activity	Amount earned in the last one year.
Salaried job			
Casual work/farm kibarua			
Off-farm kibarua			
Remittances			
Rentals			
Pension			
Micro-business/self-employment			

C20. Amount received as gifts. Cash _____

In kind _____

E. FINANCIAL MARKET.

E1. Do you have access to money lending facilities? _____
1 = Yes 2 = No

E2. Which ones? (List all in order of importance) _____

1 = Relative, 2 = Private moneylender, 3 = commodity trader, 4=Co-operative, 5 = AFC, 6 = Land settlement trustee, 7 = Commercial Bank, 8 = Mutual assistance from neighbors, 9 = Micro finance institutions, 10 = Village Bank, Others =11 (specify).

E3. Have you or your spouse ever applied for loan from any source in the last five years? _____
1 = Yes, 2 = No

If **No** to E3 Go to **F23**, if **Yes** to E3 Please fill out the table below.

LOAN APPLICATIONS:

E4	Loan application order (Number)					
E5	Year					
E6	Purpose 1=Education (school fees) 2=Non farm business 3=Farm inputs 4=buy land 5=Buy livestock 6= Food and clothing 7=Ceremony 8=Other (specify)					
E7	Type of Lender 1=Relative, 2=Private moneylender, 3 = community trader, 4 = cooperation, 5 = AFC, 6 = Land Settlement Trustee, 7 = Commercial Bank, 8 = Mutual assistance from neighbors, 9 = other (Specify)					
E8	Amount applied for Kshs.					
E9	Did you receive a loan? 1 = Yes 2 = No					
E10	If no, why not? 1 = didn't meet requirements, 2 = credit flow exhausted, 3 = late application, 4 = other (Specify)					
E11	If yes, type of payment, 1 = cash, 2 = kind, 3 = mixed.					
E12	Amount received in Kind (specify what)					
E13	Units used for payment in kind					

E14	Amount received in cash (Kshs)					
E15	Repayment period (Months)					
E16	Interest rate (p.a.)					
E17	Type of collateral required for loan. 0 = none. 1= land. 2 = building. 3 = animal. 4 = co-signatory. 5 = group. 6 = agric produce. 7 = other (Specify)					
E18	Value of collateral. where relevant.					
E19	Amount of loan currently outstanding (Kshs)					
E20	Accumulated payments so far (Kshs)					
E21	Would you have liked to borrow more at the interest rate above? 1 = yes. 2= no					
E22	If yes. why didn't you borrow more? 1 = funds exhausted. 2 = was not aware more was available. 3 = my bank/lending institution has a maximum borrowable amount. 4 = other (Specify)					

E23 Why do you prefer to borrow from that particular source of credit? _____
1 = less restrictive. 2 = no cost. 3 = easily available (less complicated application problems. 4 = higher amounts of credit. 5 = other (specify).

E24. Suppose more credit was available. what would you do with the extra? _____
1 = pay school fee. 2 = invest in non-farm business. 3 = buy farm in. 4 = buy more land. 5 = buy (more) cattle. 6 = spend on household food/clothing needs. 7 = pay dowry. 8 = other (specify)

E25. If you hadn't applied for loan in the last 5 years from a co-operative or bank. what is the reason? _____

1 = no need. 2 = other sources available. 3 = do not meet requirements. 4 = lack of awareness. 5 = other (specify)

E26 Do you have a savings account with a formal banking institution? _____
1 = yes. 2 = no

Give the name of the institution _____

E27 Are you or your spouse a member of a local savings or credit association_____
1 = yes. 2 = no
If Yes. which type? ____ 1 = formal association. 2 = informal association. 3 = both

E28. Why don't you have a savings account? _____
In what do you normally save _____

E29. Distance to the nearest formal credit source? (Kms)_____

E30. What in your opinion should the government do to improve access to credit services?

_____

_____

_____

F. RISKS AND COPING STRATEGIES.

NEGATIVE SHOCKS:

F1 In the last 15 years, how often have you experienced any of the following in the household?

0 = No (None of the following) **If no, go to F10**
1 = complete or near complete crop loss due to drought (at least 50% loss),
2 = complete or near complete crop loss due to causes other than drought (Specify – floods, locusts, diseases).
3 = complete or near complete herd loss (specify cause) due to thefts, wildlife production, drought, diseases etc (at least 50% loss).
4 = Labor problems due to illness of household member.
5 = loss of permanent employment by a household member,
6 = major cut in household income due to falling prices of crop or livestock (identify relevant livestock or commodity).
7 = household or business loss due to fire, theft or violence (specify cause)
8 = Human injury or illness necessitating hospitalization or continuous medical Treatment.
9 = death of a household member.
10 = death of a family member not resident in the household,
11 = Threat of eviction from residence.

F2	Event ID	1	2	3	4	5	6
F3	Type of shock (see codes for A9)						
F4	Frequency (Number of times in the last 20 years)						
F5	Action taken (see codes below) last time it occurred.						
F6	If received assistance from family, what kind of assistance? 1 = cash, 2 = in kind. 3 = work in house or on farm. 4 = Other (Specify)						
F7	If received assistance from family, friends – from whom?						

	1 = family member, resident in household 2 = = family member, not resident in household. 3 = friend. 4 = member of informal support group. 5 = member of formal support group. 6 = Other (Specify).						
F8	Has socio-economic status prior to shock been regained? 1 = yes, 2 = no						

Codes for F5 (COPING STRATEGIES)

1 = Nothing
2 = Prayed
3 = Sold off livestock
4 = Sold next harvest in advance at below market price
5 = Sold household food supply
6 = Sold land
7 = Sold household assets
8 = Cut household expenses (reduced consumption).
9 = Took on an extra job
10 = Used savings.
11 = Borrowed money using land or crop as collateral.
12 = Borrowed money without any collateral.
13 = Took children out of school.
14 = Received assistance from family and friends.
15 = Received food aid.
16 = Other (Specify)

CLOSING REMARKS:

F10. What is the characteristic meaning of poverty in your area? _____
(Note the 1st three).
1=inability to pay school fees for children. 2= poor housing
3= inability to pay for health services. 4= inability to feed family
5= inability to clothe. 6= little or no land. 7= no livestock, 8= other specify.
List in order of importance

F11. Within this community, what in your opinion causes some households to be poorer compared to an average household in this area?_____

1= low land holding. 2= not enough labour size. 3=laziness, 4= no remittance income, 5= low education. 6=not a good farmer. 7= other (specify) (**Note the first three).**

F12. Compared to an average farm household in this location, how would you rate yourself? _____ 1= rich. 2= same, 3= poor, very poor = 4.

F13. What are your top three priorities for improving your family well-being?
_____

1= obtain more land. 2= increase income yields on my existing land. 3= obtain more animals. 4= obtain salaried employed. 5= start business/earn in existing, 6= other (specify) **List in order of importance.**

Thank you!