

**DETERMINANTS OF AGRO-PASTORALISTS' PARTICIPATION IN EMERGING
LAND MARKETS AND ITS EFFECTS ON LIVELIHOODS IN LAIKIPIA AND WEST
POKOT COUNTIES, KENYA**

BY

LINET CHERONO RUTOH

A56/89969/2016

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE AWARD OF THE
DEGREE OF MASTER OF SCIENCE IN AGRICULTURAL AND APPLIED
ECONOMICS**

DEPARTMENT OF AGRICULTURAL ECONOMICS

FACULTY OF AGRICULTURE

UNIVERSITY OF NAIROBI

2019

DECLARATION

This thesis is my original work and has not been presented for the award of a degree in any other institution.

Linet Cheronno Rutoh

Reg. No. A56/89969/2016

Signature..... Date.....

This thesis has been submitted with our approval as university supervisors.

Dr. David Jakinda Otieno

Department of Agricultural Economics, University of Nairobi

Signature..... Date.....

Prof. Willis Oluoch-Kosura

Department of Agricultural Economics, University of Nairobi

Signature..... Date.....

Dr. Stephen Mureithi

Department of Land and Resource Management, and Agricultural Technology, University of Nairobi

Signature..... Date.....

Dr. Gert Nyberg

Department of Forest Ecology and Management, Swedish University of Agricultural Sciences, Sweden.

Signature..... Date.....

DEDICATION

I dedicate this thesis to my parents, William and Pauline Rutoh, besides my siblings for their unwavering love and support all through my study period.

ACKNOWLEDGEMENT

I wish to appreciate my supervisors Dr. David Jakinda Otieno, Prof. Willis Oluoch-Kosura, Dr. Stephen Mureithi and Dr. Gert Nyberg for their tireless efforts in guiding and supporting me during the entire period, and for their positive criticisms that enabled me to continuously improve this thesis. Special thanks also go to the Government of Kenya and the African Economic Research Consortium (AERC) for the scholarship opportunity to pursue a master's degree in Agricultural and Applied Economics at the University of Nairobi and the Land, Livestock and Livelihood (Triple L) project (www.triplel.se) for partially funding my field work. I am also indebted to the whole data collection team from the field guides to the enumerators in Laikipia and West Pokot Counties for their good work. I also appreciate the support of my colleagues for sharing with me useful ideas during the entire period of study. Above all, thanks to our Almighty God for making every step possible.

TABLE OF CONTENTS

DECLARATION	i
DEDICATION	ii
ACKNOWLEDGEMENT	iii
LIST OF FIGURES	vi
LIST OF TABLES	vii
LIST OF ABBREVIATIONS AND ACRONYMS	viii
CHAPTER ONE	2
1.0 INTRODUCTION	2
1.1 Background Information	2
1.2 Statement of the Research Problem	5
1.3 Objectives of the Study	6
1.4 Hypotheses	7
1.5 Justification of the Study	7
1.6 Study Sites	9
1.6.1 Laikipia County	9
1.6.2 West Pokot County	11
1.7 Organization of the Thesis	13
CHAPTER TWO	14
2.0 LITERATURE REVIEW	14
2.1 Significance of Land in Kenya	14
2.2 Land Markets in Selected African Countries	15
2.3 Evolution of the Land Markets in Kenya	16
2.3.1 Land Rental Markets in Kenya	17
2.3.2 Land Markets Development in Laikipia County	18
2.3.3 Land Markets Development in West Pokot County	19
2.4 Agro-pastoralism in Kenya	20
2.5 Land-related Conflicts	21
2.6 Determinants of Land Market Participation	22
2.6.1 Household Socio-Economic Factors	22
2.6.2 Social Capital	24
2.6.3 Transaction Costs	24
CHAPTER THREE	27
3.0 METHODOLOGY	27
3.1 Conceptual Framework	27

3.2 Theoretical Framework.....	29
3.3 Sampling Procedure.....	30
CHAPTER FOUR.....	34
4.0 CHARACTERIZATION OF THE FORMS OF LAND MARKET PARTICIPATION AND LAND-BASED ENTERPRISES IN LAIKIPIA AND WEST POKOT, KENYA.....	34
4.1 Abstract.....	34
4.2 Introduction.....	35
4.3 Characterization of Households by Demographic and Socio-economic Attributes	36
4.4 Characterization of the Forms of Land Market Participation	40
CHAPTER FIVE	45
5.0 DETERMINANTS OF LAND MARKET PARTICIPATION	45
5.1 Abstract.....	45
5.2 Introduction.....	46
5.3 Analytical Method	47
5.4 Factors Influencing Land Market Participation by Agro-pastoralists.....	48
CHAPTER SIX.....	51
6.0 EFFECTS OF LAND MARKET PARTICIPATION ON LIVELIHOODS	51
6.1 Abstract.....	51
6.2 Introduction.....	52
6.3 Analytical Method	53
6.4 Effects of Land Market Participation on Household Total Income	53
CHAPTER SEVEN	57
7.0 EFFECTS OF LAND-RELATED CONFLICTS ON LAND USE.....	57
7.1 Abstract.....	57
7.2 Introduction.....	58
7.3 Analysis of Data.....	59
7.4 Effects of Land Conflicts on Percentage of Land in Use.....	60
CHAPTER EIGHT	63
8.0 GENERAL CONCLUSIONS AND RECOMMENDATIONS	63
8.1 Conclusions.....	63
8.2 Recommendations.....	64
9.0 REFERENCES	66
APPENDICES	81
Appendix 1: Checklist Questions for Focus Group Discussions.....	81
Appendix 2: Household Survey Questionnaire.....	i

LIST OF FIGURES

Figure 1: Map showing Laikipia County	9
Figure 2: Map showing West Pokot County.....	11
Figure 3: Conceptual Framework	28
Figure 4: Land-based Livelihood Enterprises.....	43

LIST OF TABLES

Table 1: Sample Participants' Characteristics	37
Table 2: Sample Participants vs. Non-Participants' Characteristics.....	39
Table 3: Main Features of the Land Markets.....	41
Table 4: Bivariate Probit on the Determinants of Land Rental Market Participation	49
Table 5: Tobit Results on Effects of Land Market Participation on Household Income.....	54
Table 6: Multiple Regression Results of the Effects of Land Conflicts on Percentage of Land in Use	60

LIST OF ABBREVIATIONS AND ACRONYMS

ASALs	Arid and Semi-Arid Lands
CIDP	County Integrated Development Plan
FAO	Food and Agriculture Organization of the United Nation
GDP	Gross Domestic Product
IFAD	International Fund for Agricultural Development
KNBS	Kenya National Bureau of Statistics
NDMA	National Drought Management Authority
NGOs	Non-Governmental Organizations
TLUs	Tropical Livestock Units
UNDP	United Nations Development Programme
WISP	World Initiative for Sustainable Pastoralism

ABSTRACT

Pastoral lands have been facing turbulent transitions over time. They have become subject to encroachment and shifts in tenure, resulting in loss of the rangelands, induced sedentarization, a radical reduction in livestock numbers and erosion of pastoral land rights. Pastoral and agro-pastoral communities are and will continue being affected by these changes, thus increasing their vulnerability. However, with these challenges, land markets, due to individualized tenure have been on the rise in a bid to improve land access among the pastoral households. Land commoditization is now common where a majority of pastoralists are able to sell, buy, and rent in/out pieces of land. However, these changes are happening in the absence of empirical evidence on the factors influencing agro-pastoralists participation in the land markets. In order to address the aforementioned knowledge gap, this study was conducted in Laikipia and West Pokot Counties to analyze the determinants of agro-pastoralists participation in land markets and the effects it had on their livelihoods. Primary survey data was collected using focus group discussions and a household survey of 336 randomly selected respondents. Descriptive statistics, bivariate probit, Tobit and multiple regression models were applied in data analysis. Results from the bivariate model revealed that land size, tropical livestock units, education level and group membership influenced pastoralists' decisions to rent in and out land, respectively. Results of the Tobit model showed that education level, type of tenure, tropical livestock units and off-farm income had significant positive effects on household income. The study recommends strengthening of tenure security by title deeds issuance to encourage more supply of land to the land markets. In order to improve education, sensitization programs on the importance of adult education should be implemented. For those able to attend the adult classes, there should be lunch provision as a means of motivating them. Such a move will encourage agro-pastoral enrollment and act as an incentive for them to stay in schools.

Key words: Pastoralists, Land changes, Land markets, Livelihoods, Kenya

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Land is an essential asset any household can own in most rural communities of the developing countries. Land ownership and use to a large extent determine the level of productivity and overall economic growth. In Kenya, 89% of the total land is in the arid and semi-arid areas and is home to almost 14 million people and about 70% of the national livestock herd and 90% of wildlife (Republic of Kenya, 2017a). Moreover, this area is dominated by pastoralism (system in which people derive most of their income from livestock) and is characterized by extensive livestock production, while the better watered and serviced semi-arid regions are characterized by agro-pastoralism, irrigated agriculture and tourism-related activities (Republic of Kenya, 2017a). Most of the livestock in Africa are kept by agro-pastoralists who are more sedentary; besides cultivating crops, they keep cattle and other livestock and are relatively commercialized. They derive at least 25 to 50% of the income from livestock production, but in some areas like Chepareria in West Pokot, they derive over 70% of income from livestock produce (Wairore et al., 2015). In addition, significant quantities of their animal feeds are from natural pastures and fallow lands.

However, over time there have been some emerging land use changes in the country. The direct causes of land use changes, involve all the tasks that directly affect land use such as road buildings, while the prime reasons vary from the demographic factors, institutional to even cultural factors (Lesschen et al., 2005). In Kenya, the ever-changing land tenure policies are the primary cause of most land use changes especially in the semi-arid regions of the country. This has seen the vast pastoral communal lands turned into individual ranches, as well as private holdings leading to the unfolding of several land use systems (Mwangi, 2006). The main driving

forces of the land changes which are complex and dynamic, include the rapid population growth and migration, economic changes such that there are higher returns to land and labour from crops than livestock, the existing policies like privatization, government laws and regulation, and environmental conditions.

Land privatization, triggered by the changing land tenure, has been on the rise in most pastoral areas and as a consequence, land values have been increasing and land rights have become more identified with individuals. This new development has led to new ways of accessing land including market-based mechanisms as opposed to when most transactions were controlled by elders. Land sales and rentals are becoming more common in response to the land scarcity although they date back to decades ago. Despite such mechanisms, land formalization practices are still outdated. For instance, laws governing land leasing such as the land titles act Cap 282, are in place but still many rural farmers cannot engage in land leasing arrangements due to poor policies (Laws of Kenya, 2010). Therefore, most prefer to engage in informal land rental markets as a way also of avoiding the high costs involved in land registry updates in case of a subdivision.

Land markets are means that assign ownership and use rights in a way that permits land to be used in the most productive ways. Land markets can increase the motivation for investment among people and for financial institutions to lend, only with secure land rights in place (Mahoney et al., 2007). However, due to uncertainties and restrictions in credit and labour markets, land sale markets are still thin and bounded to distress sales. In such situations, land rental markets (renting in) can play an essential role in boosting land use and access to those in need (Holden et al., 2009; Jin and Jayne, 2013). There are also emerging affirmations and insights in the functioning of land markets and institutions that have won over renewed attention to land access, which is a crucial poverty reduction mechanism (Deininger and Jin, 2005).

Land markets come with several advantages. For instance, land ownership transfer allows for the land to be used as collateral. In areas that experienced shocks such as droughts but with some form of safety nets, land sales occurred for productive investments. This move made the land buyers more productive than the sellers. However, in places where such safety nets were missing, the majority of land sales were pushed by the need to obtain food and medication (Rahman, 2010). In addition, land sales allow households who desire to move into non-agricultural economic enterprises to utilize the chance of exploiting other economic activities. On the other hand, land rentals though theoretically, reduces land holdings inequalities by allocating land from the land-abundant households to households with high labor to land ratio. Such allocation works well in land-constrained countries with rapid population growth (Duangbootsee, 2018). Moreover, equalization of land sizes has been observed in Kenya especially through rental markets (Jin and Jayne, 2013).

In the pastoral areas of Kenya, ensuring tenure security is still a challenge as a result of having both proponents of individual and group ownership at the same time (Obeng-Odoom, 2011). In addition to this challenge, the declining land sizes and recurring droughts have forced the majority of the agro-pastoralists to seek alternative livelihood options of generating income and reducing vulnerability to shocks.

1.2 Statement of the Research Problem

Land in the ASALs is progressively getting scarce due to faster-growing population and land degradation. More so, the average land holding sizes are fast declining (Muyanga and Jayne, 2014). Coupled with insecure tenure, competition due to diminishing resources, and land use changes, most agro-pastoralists have been forced to privatize their land holdings.

Such privatization has led to over-subdivision of communal land, leading to its fast decline. Moreover, most agro-pastoralists decide to venture into different land enterprises such as cultivating crops and pastures, establishing private grazing reserves and trading in natural resources (Flintan, 2011). Apart from privatization, sedentarization is coming up where fewer cattle are kept and pastoralists' movement tends to decline over time (Wernersson, 2013). The pastoral communities are therefore forced to migrate to adjacent areas where privatization has not been enforced (Greiner et al., 2013). In most cases, such a move normally triggers conflicts brought about by uncertain land boundaries or when one clan claims ownership to land that belonged to another clan.

In such situations, land becomes a commodity to trade in especially when access to sufficient land for a pastoralist way of life decreases, giving rise to the emergence of land markets. Whether it is a rented, inherited or sold land, there exist contractual agreements that can be both formal and informal (Gebre, 2009). Laikipia and West Pokot Counties are examples of such areas. Most of the times, they are faced with land use changes and land-related conflicts between wildlife, human, and livestock over the little pasture and few watering points available. Agro-pastoralists living within wildlife migratory corridors, suffer both livestock and crop destruction, worsening the conflicts since there exists a significant inequality on who reaps the benefits and who bears the costs of maintenance and restoration of the resources. Characterized by the

downward rise of resource exhaustion and the declining resilience against drought as well as shrinking rangelands, households are unable to sustainably subsist on the assets they own.

Therefore, for such households to survive, they are forced to shift their livelihoods by adopting different coping strategies including participating in land markets. As noted by Jin and Jayne (2013) land sales and rentals improve production and income efficiency, thus contribute to reducing poverty. However, Greiner et al. (2013), and Catley et al. (2013) showed that land privatization challenges trigger socio-economic differences and can negatively impact pastoral livelihoods. Moreover, they will determine the pastoralist's capacity to participate in the emerging land markets as well as in land commoditization. Despite this, there is a dearth of empirical literature on land market participation and its effects on agro-pastoralists livelihoods in Laikipia and West Pokot Counties. This is the knowledge gap that the present study sought to fill.

1.3 Objectives of the Study

The main objective of this study was to analyze the determinants of agro-pastoralists participation in emerging land markets and its effects on their livelihoods in Laikipia and West Pokot Counties. The specific objectives were to:

- i. Characterize existing forms of land market participation and land-based livelihood enterprises.
- ii. Analyze the determinants of renting, selling, buying and leasing of land by agro-pastoralists.
- iii. Determine the effect of land market participation on households' total income.
- iv. Assess the effect of land-related conflicts and institutional factors on the proportion of land used productively.

1.4 Hypotheses

- i. Household assets, education level and land size have no effect in renting in/out, selling, and buying of land.
- ii. Land market participation has no influence on the household's total income
- iii. Land-related conflicts and institutional factors do not affect the proportion of land used productively.

1.5 Justification of the Study

The United Nations Development Programme (UNDP's) first and second sustainable development goal is to end poverty and hunger. In order to achieve this goal, knowing the forms of land markets will improve agro-pastoralists ways of accessing resources. Securing access to land is an easier way of accessing water and feed and thus a risk-coping mechanism against natural disasters. Furthermore, the secure access allows agro-pastoral households to use family labor thus increasing crop residue supply and stubbles for animals. This will improve the situation in these areas and mostly on household food security and income (FAO, 2016). Furthermore, secured access to land will allow the support of projects such as boreholes sinking and rainwater harvesting for irrigation purposes and livestock uses, community fodder/pasture banks as well as reseeded. Such projects will act as an avenue for livelihoods diversification to support sustainable livelihoods which are in line with the national food and nutrition security policy (Republic of Kenya, 2017c).

The knowledge from this study will be of essence to the residents and policy makers of the ASALs in making the land markets work as a poverty reduction strategy. This is also in line with the National land policy objectives for rangelands rehabilitation. Land markets will work for the agro-pastoral communities if a legal framework to regulate the land transactions are put in place.

The findings from this study especially on land-related conflicts will inform policy makers on sustainable ways of resource management. This is in line with the Kenya Vision 2030 Statement for Northern Kenya, 2011 goal which is to ensure that the needs of pastoral land users are fully taken into account. Sustainable land management in the phase of conflicts will improve how land is utilized by the agro-pastoral households during both dry and wet season. More so, establishing appropriate methods for explaining and registering land rights in these areas while enabling the pastoralists to maintain their unique land systems and livelihoods will work in reducing the conflicts (Republic of Kenya, 2017b).

1.6 Study Sites

1.6.1 Laikipia County

As shown in Figure 1 below, Laikipia County lies between latitudes 0°18'' South and 0°51'' North and between longitude 36° 11'' and 37° 24' East. By land size, it is the 15th largest in the country covering 9,462 km².

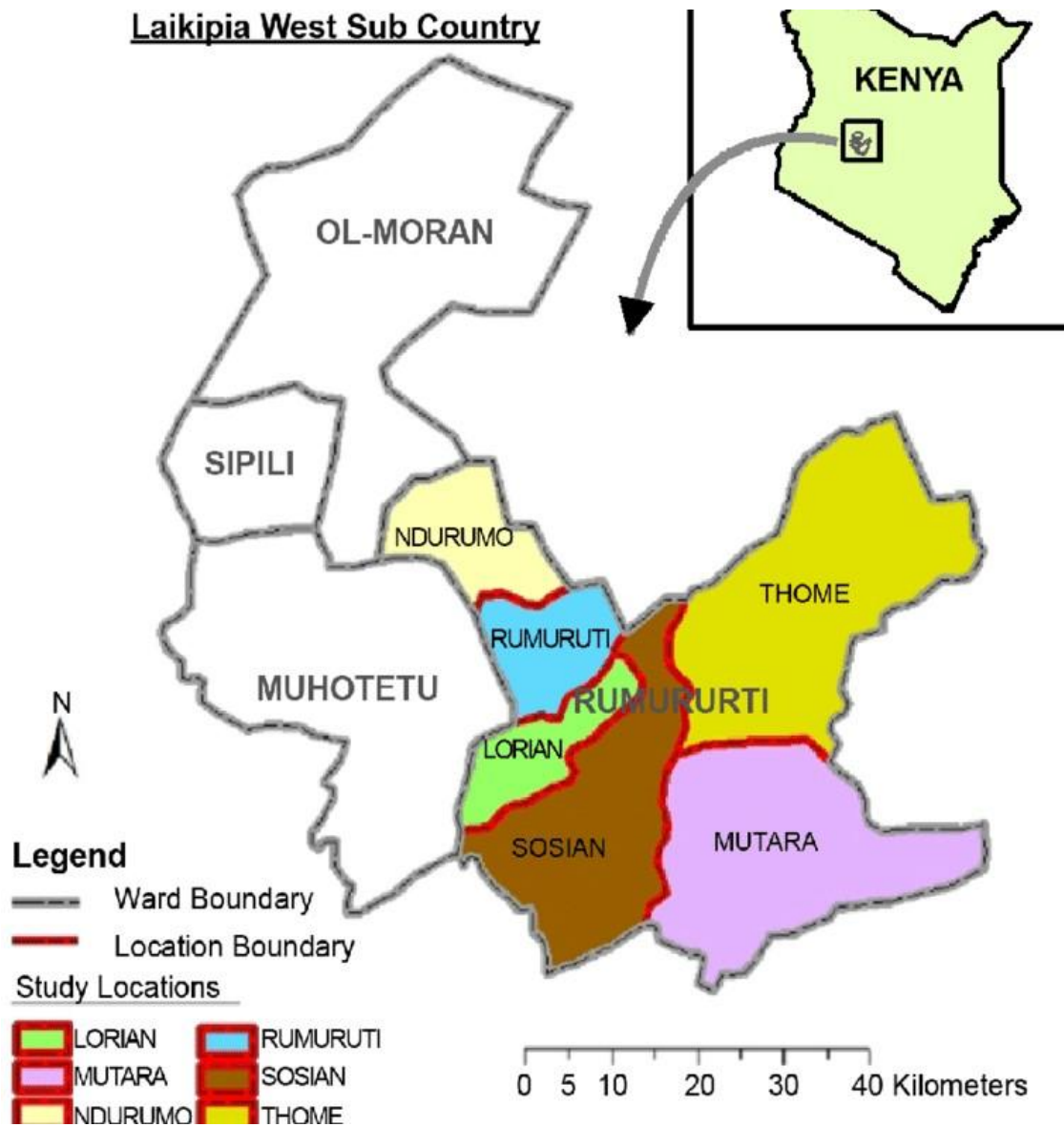


Figure 1: Map showing Laikipia County

Source: IEBC (Independent Electoral and Boundaries Commission) (2012).

The County has six land use patterns according to their ecological zones. They include mixed farming, pastoralism, agro-pastoralism, ranching marginal mixed farming and formal business or trade. As at 2009 census, the County had a population of 208,725 people with Rumuruti ward having 32,993 persons. The average farm size is 2 acres for small scale, 20 acres for large-scale holders, and 23 acres for the ranching community. The most common soils are loam, clay and sand. On the hillsides, the major soils present are the dark reddish brown to red crumbly and rocky soil. Annual temperature ranges between 16°C and 26°C. The annual average rainfall ranges between 400mm and 750mm though higher yearly rainfall totals are observed in the areas bordering the slopes of Mount Kenya and the Aberdare Ranges. North Marmanet receives over 900mm of rainfall annually; while the drier parts of Mukogodo and Rumuruti receive slightly over 400mm annually (CIDP, 2018).

Land ownership in the County is classified as private, communal and government land. The private land is on freehold titles while communal land is held under group ranches. The government land includes cattle holding grounds, gazzeted forests, public institutions land, rivers, Agriculture Development Corporation (ADC) Mutara Ranch and all leased land in urban centers and ranches. Most landowners (65.3%) lack title deeds to their land due to lengthy land adjudication and transfer process (CIDP, 2018). Due to lack of proper legislation, land subdivision is on the rise creating uneconomical land parcels. The sub-division is manifested by the existing land buying companies in the area who subdivide range land to 2 to 5 acres yet the land carrying capacity for a livestock unit is 4 acres.

1.6.2 West Pokot County

West Pokot County, as shown in Figure 2 below, borders Turkana County to the North and North East, Trans Nzoia County to the South, Elgeyo Marakwet County and Baringo County to the South East and East, respectively.



Figure 2: Map showing West Pokot County

Source: National Drought Management Authority (NDMA, 2014).

The County lies between Longitudes 34° 47' and 35° 49' East and Latitude 1° and 2° North. It covers an area of approximately 9,169.4 km². It receives long rains between April and August and short rains between October and February. Due to variations in the county, the lowlands get 600mm per annum while the highlands get 1600 mm annually (NDMA, 2014). Temperatures range from 15° C to 30° C. The total County population as per 2009 census was at 512,690 with the study area having 41,563 persons and the Pokot are the most dominant tribe (KNBS, 2009). The main land uses are agro-pastoralism, mixed farming and pastoralism (CIDP, 2018).

The soil types vary from shallow and crumbly in the lowlands to deep, well-drained, reddish brown sandy loams in the upper regions of Chepareria (Sposito, 2013). The vegetation is mainly dominated by grasslands, native and foreign tree species (Svanlund, 2014). Land ownership is both freehold and communal. Majority of the shared land, where pastoralism prevails, is found in the lowlands while freehold land ownership is mainly in the highlands where land is arable. Less than 40% of the households in the County possess title deeds owing to the poor land adjudication which has resulted in tenure insecurity and land-related conflicts. Most of the times these conflicts are either as an outcome of unsure land boundaries or where two clans fight for ownership of one land parcel. Such conflicts are always short-term occurring only during the dry periods since individuals tend to search for alternative livelihood source.

The study was done in the two Counties due to different land use dynamics experienced in both areas. For instance, Laikipia County operates as 'informal grazing areas' that were subdivided and largely remain unoccupied hence known as '*abandoned lands*'. These *abandoned lands* are the former large-scale ranches that were purchased and sub-divided. The creation of sub-economical small holdings hence led to the abandonment of agricultural activities by the legal owners. This makes Laikipia County suitable for the research in order to understand the

functioning of land markets in areas acting as pastoralist's informal grazing areas. On the other hand, West Pokot County is dominated by enclosures which coincided with tenure individualization. Enclosure introduction has led to increase in vegetation cover, decreased land degradation as well as regulated grazing. Secondly, they are instrumental in enabling majority of households to use land for agribusinesses purposes and in some instances also the buying, selling and/ or renting of land. Given the distinct features, comparing how land markets function in the two environments will offer useful insights.

1.7 Organization of the Thesis

This thesis is organized into eight chapters. The research issue, objectives and study sites have been explained in chapter one. The next chapter provides a review of the relevant literature, while the methodology is described in chapter three. The empirical analysis, results and key conclusions are discussed in chapters four, five, six and seven, which are presented in paper format focusing on each specific objective. The final chapter summarizes the main findings, offers some policy implications and suggestions for further research.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Significance of Land in Kenya

In Kenya, over 80% of the population rely on land for their production to generate a living. Land acts as a factor of production, a capital asset and a source of cultural identity. For the rural community dwellers, land is the backbone of most of their economic activities and rural livelihoods such as farming and hunting (Mwagore, 2003). The size and type of land accessible to households and communities is important to food production and stability.

Over 89% of the Kenyan land mass is covered by arid and semi-arid areas which are highly prioritized for investment and economic development (Republic of Kenya, 2017a). These areas which mostly support pastoralism, are highly at risk to climate change and variability, leading to increased land degradation, levels of poverty and human conflict. Land, in general, provides security in cases where access to resources and formal employment opportunities are lacking. It has major cultural, spiritual and historical significance as it is a symbol of unity and gives a sense of belonging to household members.

Land has varying importance for different groups of people. For instance, for peasants, toiling from dawn to dusk, land is a source of food and income. For pastoralists, land caters for their livestock. For the fishermen, guaranteed access to rivers, lakes and oceans puts dinner on the table. The hunters and gatherers spend time in the forests gathering roots and trapping small game to meet their daily needs.

2.2 Land Markets in Selected African Countries

Land markets have dated way back in most of the African countries. They have been on the rise as a mechanism of improving access to land. Despite them still operating under traditional settings, majority of the households are gaining access to grazing spaces, cultivation and fodder production spaces. In Uganda for instance, land was divided among the notable in the society resulting in imbalances. The imbalances led to sub divisions and soon to the formation of large tenant community in these lands.

In addition, land titles were issued and this spurred land sales since tenants had acquired more rights to allow them to transact in the land markets. In the 1980s about 60 to 85% of the land was under tenancy arrangements (Kisamba-Mugerwa and Barrows, 1989). According to Uganda National Household survey of 2005/06, 59% of agricultural land acquisition involved purchases through formal markets in the central region; 47% in the western regions; 39% in the eastern region; and 6% in the northern regions. The low level of participation in the northern region is due to the fact that land is communally owned (World Bank, 2015).

In Ethiopia, tenancy which existed before the 1974 land reforms are still in existence. Rahmato (1984), estimated that more than 40% of the land was operated by tenants who represented more than one-third of the total population. Land rentals have increased with about a quarter of all rural families being engaged in land rental transactions. Most of the transactions are however informal sharecropping with neighbours and relatives (Gebreselassie, 2006).

Sharecropping was preferred since it acted as a strategy to get missing inputs and rent a more convenient land. The analysis of 2008 data showed how land rentals among the female-headed households had increased due to land certification. The tenure security has allowed them (female-headed) to better negotiate in the rental markets. Although the land rental market is vibrant throughout most of the country, surveys of rural areas indicate that many households

would like to rent more land than they are currently able to access in the market, indicating that the market may to some extent be constrained (Deininger et al., 2009).

In Rwanda, land markets are very active despite their lower levels of population density. A survey conducted by the World Bank in early 2011 showed that 23% of the households surveyed had purchased land in the past 5 years while 12% had sold their land parcels. The rental markets on the other hand, are vibrant with about 27% of the households renting in and 12% renting out. All this has been possible through the country's land registration program which ensured that it improved land use productivity, reduced conflicts and improved the overall governance (World Bank, 2011).

2.3 Evolution of the Land Markets in Kenya

Land scarcity is growing in many parts of Africa, Kenya included and land markets are emerging and becoming more active (Holden et al., 2008). This is fueled by the growing population and urbanization, which have been the reasons for continuous land degradation. The sharp increase in the demand for land following the hikes in food and energy prices in 2007-2010 revealed weaknesses in land tenure systems and policies (Deininger et al., 2014). In addition, the increased land demand from investors has brought about fears that vulnerable groups would lose their land rights and in turn become food insecure (de Schutter, 2011; German et al., 2013). Therefore, the only option of accessing land to meet this need as well as improve livelihoods is through formal and informal land markets.

Land markets play a significant role in a country. For instance, land sales improve and influence agricultural productivity and efficiency as well as the level of industrial investments. On the other hand, land rentals allow land access, which in turn increases the rural household's incomes through renting in and out (Yamano et al., 2009).

Land markets development is dependent on the existence of a land price, a willing buyer and seller, for a sale transaction to take place. However, the high transaction costs and the existing weak institutional arrangements make the process rigid and cumbersome (Nyangena, 2010).

2.3.1 Land Rental Markets in Kenya

Land rental markets have been shown to be pro-poor in many contexts (Holden et al., 2008). For instance, female-headed landlords who lack resources to farm their land are able to rent out their land; gain through sharecropping arrangements, hence improved food security and household income. Moreover, the poor landless with more labor capacity is in a position to rent in land (Holden et al., 2011). An active land rental market is likely to reduce the incentives to sell land since it reduces the need for capital needed in accessing land. The rental market's advantage of reducing the need for credit for buying land may be more important than the usefulness of land as collateral in developing countries where the sales market for land does not work well enough to favor the use of land as collateral (Holden, 2013).

However, due to the poor functioning of legal land renting markets in Kenya, most agro-pastoral households opt for informal ones. The most commonly used one is the cash rental involving written agreements with or without witnesses present. The deal is short-term lasting for only one season with the land rental rates varying depending on the plot size, soil fertility and the relative land scarcity in the region. Moreover, due to land markets being thin and fragmented, rental prices are localized geographically and mostly depend on the household's economic status (Deininger et al., 2008).

Sharecropping is the main method of payment in areas with stronger social ties, thus reducing the monitoring, enforcement and incentive costs. It is also considered to be much more beneficial to pool and share risks for risk-averse households. This explains the lower transaction costs among individuals with close relations (Holden and Ghebru, 2005).

2.3.2 Land Markets Development in Laikipia County

Land transitions in the County took place in two phases. The first transition occurred after the Anglo-Maasai treaties between 1904 and 1911, which saw the transition from pastoral rangelands governed by customary tenure to large-scale private ownership in form of cattle ranches (Hughes, 2005 and 2006). The treaties forced the eviction of the Maasai from their productive areas to other two reserves paving way for European settlement in the Rift valley (Hughes, 2006). The move led to the establishment of large land holdings under their ownership in form of private cattle ranches and in areas where wildlife are most concentrated.

The second transition occurred following Kenya's independence between 1963 and 1980s, which saw land change from European ownership to smallholdings distributed to indigenous Africans. The redistribution occurred through the government's settlement schemes and land buying companies (Letai and Lind, 2013). This took place through a willing buyer/seller that accommodated the Europeans leaving the country, and the aspirations of indigenous Kenyans who wished to own land (Onoma, 2010). The indigenous Kenyans who got the plots were squatters on Laikipia ranches and residents from the central highlands who were experiencing high land pressure. In addition, these sub-divisions caused the emergence of '*abandoned lands*' which were left by the legal owners due to insecurity, crop failures and human-wildlife conflicts. Settlement by semi-nomadic pastoralists and smallholder farmers has been on the rise in these abandoned lands for them to graze and practice subsistence livelihoods. These areas also operate as open access patches for pastoralists from both within and outside Laikipia (LWF, 2012).

Due to lack of proper formal policies for managing the abandoned lands, pastoralists are now living in fear of the possibility of government evictions. This has seen a number of pastoralists adopting private titles from the legal owners who could be identified and contacted. This is a move to improve their tenure security to avoid being evicted and still enable them to access other rangeland resources. Other motives for pastoralists purchasing these lands were for them to

engage in agricultural production (near water sources), inheritance purposes, to gain a residential base near educational opportunities for children, and access to markets in Rumuruti (Wade, 2015).

2.3.3 Land Markets Development in West Pokot County

Before the 1980s, West Pokot County was a vast degraded landscape characterized by few short and tall trees. However, in an effort to rehabilitate the degraded land and hence intensify production, enclosures and agroforestry were introduced. With the initial adaptation being slow, livestock diseases, droughts and subsequent famine drove the residents to adopt the enclosures to a point where the majority of West Pokot areas have been enclosure-dominated in recent years (Nyberg et al., 2015).

With enclosures, livelihoods are now less-dependent on livestock mobility due to easy accessibility of pasture as well as crop production, which is complementing the livestock production. This transition has led to a shift in the local tenure regime away from a communal tenure towards individual tenure rights (Nyberg et al., 2015). In addition, they have permitted households to use land for commercialized livestock and agricultural production as well as in some instances sell, buy and or rent in/out of land. It is also through enclosures that land market activity has gained popularity since they have been used as a method of property demarcation. Between 2007 and 2010, land prices especially the ones near the roads rose by at least 40% (Greiner and Mwaka, 2016).

People are now able to sell or lease out parts of their land to earn money to buy food during dry spells or famine, pay school fees or medical costs, or when they have fewer animals. Geutjes (2013) noted that with the increasing importance of agriculture, the need for having a cultivable land increases and claims on what used to be communal land, are made and the land is privatized quickly. Land markets have also enabled land to be officially registered into different tenures.

For instance, the upper areas of Chepareria (Senetwo, Ywalateke) possess individual title deeds, while the trust land and group ranches of the lower areas have been and are being sub-divided into privately enclosed land rooted on informal contractual agreements to secure their properties. On group ranches, residents are registered under group ranch title deeds that officially imply legal access to the whole group ranch land.

2.4 Agro-pastoralism in Kenya

Pastoral systems, contribute 10% of the country's Gross domestic Product besides the indirect benefits (Republic of Kenya, 2017b). Pastoral lifestyles are varied and include different systems. Depending on the herd's movement, there exist transhumant pastoralists who move livestock between fixed points to ensure feed availability, nomads who move along depending on rainfall patterns and the agro- pastoralists.

According to Blench (2001), agro-pastoralism is part of the pastoral livestock production system, but they are more settled with crop production practices and permanent homesteads. They derive 25 to 50% of their income or consumption from livestock production and are either crop dominated or livestock dominated. It is practiced in areas that receive between 500 mm and 900 mm of rainfall per annum. Agro-pastoral land use systems have been on the rise in Kenya as explained by Gumbo and Maitima (2007) and Mwang'ombe et al. (2009) leading to intense competition for land resources between crops and livestock.

Agro-pastoralism was adopted when the pastoral households were faced with the challenges of recurrent droughts, land use changes, demographic pressure, and mostly conflicts due to diminishing resources. They had to look for an alternative source of livelihood away from pastoralism only (Watson, 2008; Galvin, 2009; Freeman et al., 2008). But just like their pastoralists counterparts, they are most times forced to migrate in search of feed for their livestock even though it is not their tradition. Women and children who are mostly left behind,

do the harvesting and storage of fodder trees and maize stovers to be used when the men return with the cattle after the drought (Makokha et al., 1999). In most instances, households lose livestock and crops in extreme weather events rendering them vulnerable and susceptible to food insecurity. In such communities, gender roles are clearly spelt out whereby the men are responsible for herding and tending for the animals. Women and children are supposed to milk the cows, take care of the sick animals and help out on the farm respectively (Tangka and Jabbar, 2005).

2.5 Land-related Conflicts

Conflicts are a struggle or contest between people with opposing ideas, beliefs, needs and values (Niklas and Mikael, 2005). According to the scarcity theory, conflicts are inevitable due to the increased scarcity of natural resources (Yasmi, and Schanz, 2007). In addition, Blench (2004), affirmed that the competition for land, water and vegetation by pastoralists and farmers coupled with the resource scarcity, demographic pressure, urbanization, and adverse climatic changes act as a precipitant in most conflicts. This is set to intensify gradually as a result of continuous land scarcity and ambiguous property rights. Moreover, it is more common when a community lacks alternative livelihoods (Bob, 2010). Moreover, land tenure changes have resulted in a lack of land use coordination and environmental insecurity (Majeke, 2005).

In sub-Saharan Africa, the land is and has always been a subject of conflicts, exploitation, and conquest giving rise to many types of inequalities and discrepancies which have remained unresolved. According to Kok et al. (2009), land dispossession and contestation in most of these countries has led to a skewed distribution of land resources. In such scenarios, the most affected parties are the poor who lack alternative sources of livelihoods since in most cases land issues are associated with poverty and inequality (UNDP, 2006). To achieve and maintain a long lasting socio-economic and political well-being of societies especially the marginalized group, then land

resources should be made more available and accessible. The stability and food security of a local community is determined by the land available, yet in Africa, land is becoming scarce in many parts of the continent (Odgaard, 2006). In Eastern Africa, land and related resources have been the center of conflicts between communities since the ownership and control of land and related resources are associated with decision making and the power to effect changes. Typically, the disputes exist between households, neighborhoods and neighboring communities, traditional and nontraditional, generational conflict over land use between interest groups, inheritance related conflicts between new-comers and long-standing residents, distribution of benefits and gender conflict of access, use, and appropriation of land benefits.

Demand for land is set to rise as the global population goes up giving room for conflicts as people tend to intensify the land use. An individual's livelihood becomes vulnerable as the size of his/her farm decreases. Bogale (2006), explains how scarcity instigated land-related conflicts in Ethiopia resulted in household vulnerability. Specifically, the absence of well-defined property rights and management led to over-use of the hillsides leading to food insecurity and poverty. Elsewhere, Bob and Moodley (2003) noted that most people have limited access and control over land and related resources leading to differing interests among the users. Access to and control of land depend on one's ability to bargain, the land quality, nature of economic and political as well as the existing local culture and economy. For the quality of life to be improved, there is a need for effective sustainable management of conflicts.

2.6 Determinants of Land Market Participation

2.6.1 Household Socio-Economic Factors

Available literature shows mixed results on the effect of age on land market participation. While some studies showed a positive influence of age on renting in land (see for example, Kung, 2002;

Vranken and Swinnen, 2006), others such as Tikabo and Holden (2004), Deininger et al. (2003), and Masterson (2007) reported a negative influence. Renting-out of land was also influenced by age as shown by Swinnen et al. (2006), Teklu and Lemi (2004), and Masterson, (2007) while Deininger and Jin (2005) reported a negative influence. A study by Goetz (1992) and Asfaw et al. (2011) on age and food crop market participation, showed that there was a significant relationship since the more one gets older, trust increases between trading partners through a repeated exchange. Moreover, the more aged a person is, the higher contacts he or she is likely to have; allowing for trade opportunities to be discovered at lower costs.

The other determinant reported was the family size, whereby the probability of renting-out land is higher among households with comparatively low subsistence pressure (smaller family size), which conforms to the findings of Teklu and Lemi (2004). Kung (2002) showed how the dependency ratio influences the decision to rent land positively. Similar results on food market participants were shown by Lapar et al. (2003) and Asfaw et al. (2012) where less participation was reported for larger households since most produce was consumed.

Household assets especially livestock and other farm capital assets increase the likelihood of a farmer renting in land in order to optimize their land sizes, as well as utilize their surplus resources as shown by Kung (2002), Tikabo and Holden (2004), Holden et al. (2007), and Masterson (2007) for households in China, Eritrea, Ethiopia, and Paraguay, respectively. In addition, Teklu and Lemi (2004), showed that the endowments of cultivable land dictate one's decision to rent out land. Holden et al. (2007) and Tikabo and Holden (2004), also found that households with insufficient non-land factors such as livestock resources were more likely to rent out land. This is because owning such assets reduces risks by lowering the incidences of market failures.

Education level is inversely related to participating in on-farm activities because the more educated a person is, the more off-farm activities he or she will get involved. As one advances

more in education, time spent on farm activities reduces and access to off-farm income raises the probability of one becoming more of a buyer than a seller. Makhura et al. (2001), offered contrary opinions that education reduces transaction costs and barriers towards the market entry. Thus, education enables one to obtain and process the information and gives room for better negotiation skills.

Gebremedhin et al. (2011) showed that credit access increases the probability of market participation especially by buyers since one is assured of some second source of income. However, it is not significant in all areas as shown in studies by Osmani and Hossain (2015).

2.6.2 Social Capital

Social capital is an institutional factor affecting participation. It refers to the personal social networks that encourage market participation, which includes cooperatives, farmer organizations/associations, farmer groups, and extension groups (Sharp and Smith, 2003). Trust is developed through these institutional interactions and in turn, encourages regular exchanges. Information and production resources are transmitted through such networks, thus linking households with markets, and promote market participation (Jari and Fraser, 2009). For instance, Christy (2001) showed that farmer associations were used as a mechanism for improving smallholder access to agricultural markets. Poulton et al. (1998) and Matungul et al. (2001) established that the associations reduced information searching as well as marketing costs.

2.6.3 Transaction Costs

As suggested by Coase (1937), transaction costs also known as ‘hidden costs’ were originally classified as the costs of finding a new partner, negotiating a sale agreement, and monitoring the trade terms. Later, Hobbs (1997) divided it into information search, negotiation, and enforcement costs. Information costs involve the sellers getting information about the market and providing information to the buyers before any transaction is done. Negotiation costs include both buyers

and sellers in the give and take situation as they decide on terms of transactions. And further, the monitoring costs involve making sure the terms of trade are abided by (Hobbs, 1997).

Several studies such as Abeykoon et al. (2013) and Jagwe (2011) have explained how transaction costs affect market participation. For instance, Abeykoon et al. (2013) found that a participant's decision was determined by opportunity costs of time involved in buying and selling, the risks associated with uncertain prices, and other household related transaction costs. Moreover, when less information exists, that transaction tends to be risky. Goetz, (1992) showed that farmers failed to trade in coarse grains due to the significant differences between selling and buying prices. According to Alene et al. (2008), transaction costs hinder market participation but with sufficient market information, it stimulates it.

2.7 A Review of Knowledge Gaps on Land Market Participation

Studies on land markets participation like Nyangena (2010) and Bizimana (2011) assessed the determinants of land market participation in rural Kenya and Rwanda, respectively. Results from Tobit regressions showed that household characteristics such as age, household size, and education level, land endowments, credit constraints and transaction costs affected the participation. These studies focused more on rental markets but omitted land sales and leases; the current study included these as well as how participation affects household income.

Studies by Deininger and Jin (2005) and Teklu and Lemi (2004) focused on land rentals and presumed that the decision to rent in and rent out land are different from each other, hence estimated separately. However, this current study built on it by proposing that the same agro-pastoralist can be involved in the land rental market, as a tenant to rent-in land as well as a landlord to rent-out land. This is due to the fact that an individual's total holdings are made up of

several pieces of land spread over a wide area characterized by different, quality, size and other factors.

Jin and Jayne (2013) also analyzed rental markets and found that participation was affected by household size, farm assets and household age among others. More so, by using a dynamic panel model they found that household income from crops increased after participation. The current study built on the literature on the emerging land markets in the phase of land conflicts.

Jabu et al. (2017) analyzed participation in agricultural rental markets in Kwale County. Transaction costs, ownership of oxen and access to extension services were found to be the main factors of land rental market participation. The current study added on the rental participation but among the agro-pastoral households in the Kenyan arid and semi-arid lands; Laikipia and West Pokot.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Conceptual Framework

Market participation has been identified as a cause and consequence of development because market accessibility provides an opportunity for households to increase their incomes (Boughton et al., 2007). Increased incomes, in turn, allow a household to buy other commodities and services they need. In addition, the households demand for other goods and services increases thereby stimulating development.

Agro-pastoralists land market participation is accustomed by a number of variables which may depend on the nature of the individual household characteristics. The conceptualization of this study is given in Figure 3 which identifies factors that influence agro-pastoralists' decision to participate or not in the land markets.

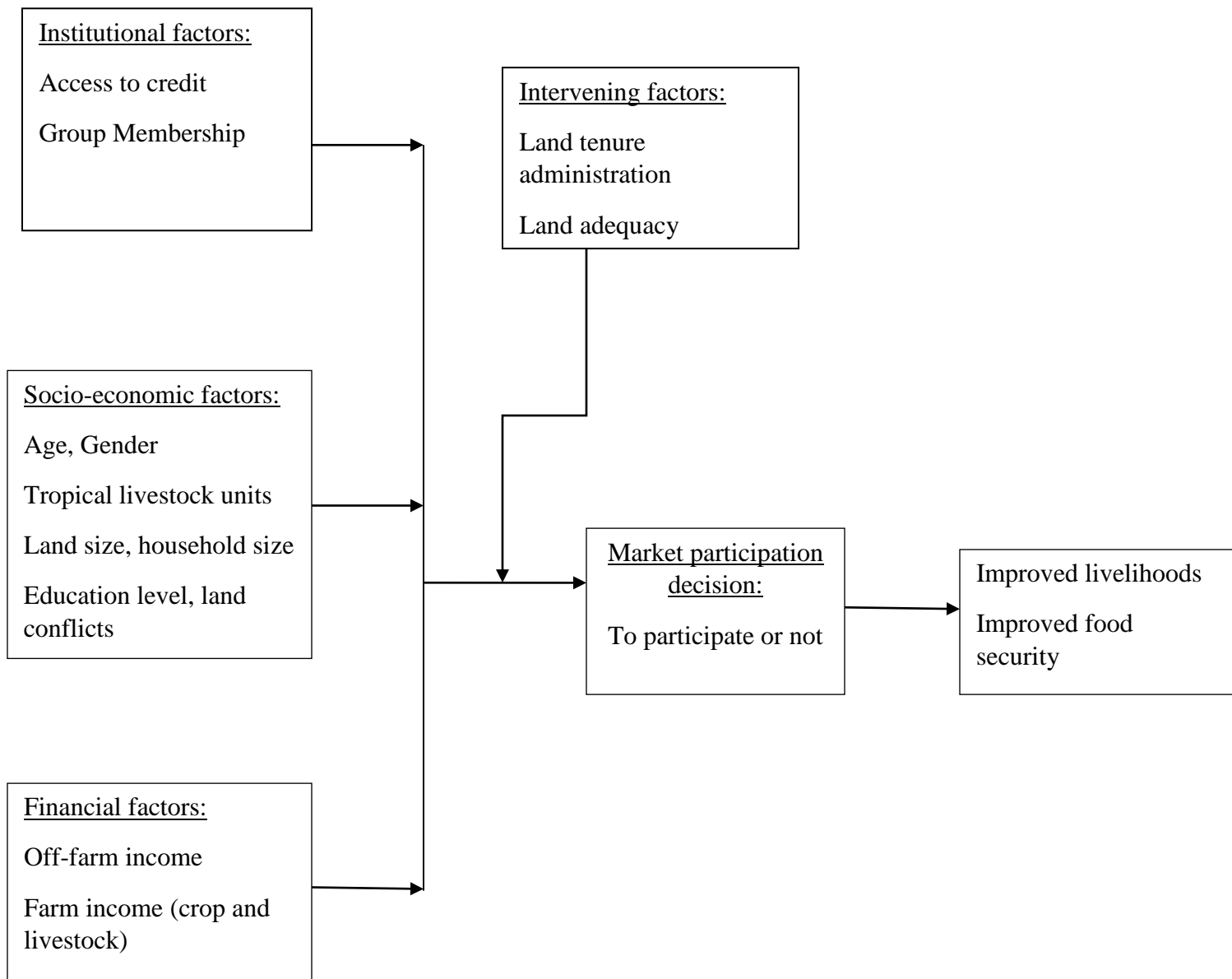


Figure 3: Conceptual Framework

Source: Author's Conceptualization

The study conceptualizes that agro-pastoral household participation is influenced by socio-economic and institutional factors. Socio-economic factors include; land size, age and gender of the household head, household size, education level, land conflicts, and tropical livestock units.

For instance, older households tend to be risk-averse and may not participate in the markets (Chilundika, 2012). Institutional factors include; extension services, access to credit from institutions, and group membership. Benefits from market participation among the agro-pastoralist's benefits trickle down and eventually translate into improved food security and livelihoods.

3.2 Theoretical Framework

The study was guided by random utility theory, which is based on the hypothesis that a rational individual will maximize his or her utility relative to his or her choices. Land market participation decision was measured by perceived utility or net benefit from the option of participating in the land market or not.

Although utility was not observed directly, the actions of economic agents were observed through the choices made. In this study, the utility derived from the two decisions, can be expressed as the linear sum of two components: (i) a deterministic part, that captures the *observable* components of the utility function and (ii) a random error term, that captures *unobservable* components of the function and is expressed as follows;

$$U_{ij} = V_{ij} + \varepsilon_{ij} \dots \dots \dots (1)$$

Where V_{ij} is the *deterministic* part, and ε_{ij} is the *stochastic* error term.

In the case of land market participation, the equation will be represented as;

$$U_{ij}(\beta_j X_i + \varepsilon_j) > U_{ik}(\beta_k X_i + \varepsilon_k) \quad k \neq j \dots \dots \dots (2)$$

The equation follows that the perceived utility or benefit from option j (participation) is greater than the utility from non-participation (k) as shown in equation 2 above.

The probability that a household will choose to participate, i.e., choose method j instead of k could then be defined as;

$$\begin{aligned}
P(Y = 1/X) &= P(U_{ij} > U_{ik}) \\
P(\beta_j X_i + \varepsilon_j - \beta_k X_i - \varepsilon_k > 0/X) \\
P(\beta_j X_i - \beta_k X_i + \varepsilon_j - \varepsilon_k > 0/X) \\
P(X^* X_i + \varepsilon^* > 0/X) &= F(\beta^* X_i) \dots \dots \dots (3)
\end{aligned}$$

Where P is a probability function U_{ij}, U_{ik} and X_i are as defined above,

$\varepsilon^* = \varepsilon_j - \varepsilon_k$ random disturbance term, and

$\beta^* = (\beta_j - \beta_k)$ are vector of unknown parameters that can be hypothesized as independent variables influencing land market participation

3.3 Sampling Procedure

A multi-stage sampling approach comprising three stages was used to select the 2 Counties and the agro-pastoralists to be interviewed. It was preferred due to its convenience and efficiency as compared to other methods. Moreover, it is convenient when the population is scattered over an area (Horpilla and Peltonen, 1992). In the first stage, Laikipia and West Pokot Counties were purposely chosen due to high incidences of land use changes. These two study areas were comparable to Turkana County (Mureithi and Opiyo, 2010) and Baringo County as established by Elhadi et al. (2012). In the second stage, Chepareria and Rumuruti wards in West Pokot and Laikipia Counties, respectively, were chosen. This is mainly due to agro-pastoral dependent livelihoods. Respective villages from the chosen locations were determined and selected randomly. Ywalateke, Kipkomo, Thome and Sosiani from West Pokot and Laikipia were the villages chosen. The selected villages in west Respondents from the selected villages were chosen randomly to allow for a fair representation of the whole population. This study sampled 336 agro-pastoralists; 175 respondents from West Pokot and 161 from Laikipia were interviewed.

The sample size was calculated as shown below following Anderson et al. (2007):

$$n = \frac{p(1-p)Z^2}{e^2} \dots\dots\dots (4)$$

Where n is the sample size being determined, p is the proportion of the population in the study areas that would be available to participate in the interview, Z is the confidence interval and E is the margin of error.

Since p is unknown due to the constant migration of the household heads, the p -value is set at 0.50 as this would give optimum sample size, with Z being 1.96 and E 0.07. This gives a sample size of 196 for each site as follows:

$$n = \frac{0.5(1-0.5)1.96^2}{0.07^2} = 196 \dots\dots\dots (5)$$

However, due to non-response and incomplete/spoilt questionnaires, the survey ended up with 336 respondents a response rate of 85%, as compared to 392 for both counties. This is also in line with other market participation studies which use sample size slightly below or above 300. For instance, Bizimana (2011) utilized 251 households to assess the determinants of land rentals in Rwanda, Nyangena (2010) used 320 households to investigate determinants of land rental participation in Laikipia, while Jabu et al. (2017) utilized 386 households to investigate the determinants of rental participation in Kwale County.

3.4 Data Collection Methods

Semi-structured questionnaires were administered through face-to-face interviews to obtain data on household characteristics such as age, education level and income, institutional services offered, types of assets owned as well as insights on land market participation. This tends to give clear answers on more probing, as well as validate the answers given. It also guarantees high response rates (Bateman et al, 2002). The interviews were conducted by 6 well-trained enumerators conversant with the local language in August 2018. Head of the households or their spouses or any other respondent above 18 years and had stayed in the household for at least 1

year was interviewed. Two focus group discussions separate for men and women each with 10 respondents were conducted. Most of the participants of the discussions were members of village land committees in the chosen areas. Focus group discussion acted as a tool for stimulating discussions on emerging land markets, the changing land sizes and the effect all these had on their livelihoods. All this was with the focus on both male and female experiences and was captured using semi-structured checklists. The groups were separated since, in most pastoral societies, women have little or no freedom of speech before men and especially on matters concerning land.

Definition of Variables in the Study

Variable	Description of the variables	Expected sign
Farm experience	Number of farming years	+
TLUs	Tropical livestock units	+/-
TT land in use	Total land in use in acres	+/-
Age	Age of household head in years	+
Farm income	Total income from farming	+
Off-farm income	Total income from off farm activities	+/-
HH size	Household size (numbers)	+/-
Type of tenure	1=private with title deeds 2=private without title deeds 3= communal	+
Education level	Dummy = 1 if one had formal education, 0 otherwise	+
Gender	Dummy = 1 if the household head is male, 0 otherwise	+
Credit access	Dummy = 1 if one had access to credit, 0 otherwise	+/-
Land conflicts	Dummy = 1 if one had experienced land conflicts, 0 otherwise	-
Land current use	Dummy = 1 if one had access to credit, 0 otherwise	-
Food shortages	Dummy = 1 if one had experienced food shortages 0 otherwise	+/-
Marital status	Dummy = 1 if one was married, 0 otherwise	+/-
Group membership	Dummy = 1 if was a member of a group, 0 otherwise	+
Market participation	Dummy= 1 if one had participated in land markets 0=otherwise	+

CHAPTER FOUR

4.0 CHARACTERIZATION OF THE FORMS OF LAND MARKET PARTICIPATION AND LAND-BASED ENTERPRISES IN LAIKIPIA AND WEST POKOT, KENYA

4.1 Abstract

Land markets in Laikipia and West Pokot Counties have been in place but it is just recently that their activeness was noted. Due to the ongoing land changes especially individualization of tenure and land usage, residents have resorted to market-based mechanisms of accessing land. The markets are informal and mostly operate in traditional settings. The study used descriptive statistics to characterize the existing forms of land markets in the two Counties.

The results show that land sales and rental markets are the most common forms of market participation. Land sales, however, are still low due to lack of title deeds despite the land being private. The sales which occur are most often as a result of distress in the households rather than choice. On the other hand, rental markets are the most active and common due to its less demand. For instance, there is no need for contract signing, and the rent price is affordable. In addition, both landlord and tenant benefit such that the tenant can comfortably acquire a piece of land for cultivation (one season) and grazing (less than six months), while the landlord gets cash from such transactions. These findings call for policy interventions that allow for the vibrancy of the markets to stimulate the local economy. These include improving the tenure security by reducing the cost and process of title deed application. In return, the household will be guaranteed of ownership and hence an incentive to trade more in the land.

Keywords: Land markets, Livelihoods, Transactions, Laikipia, West Pokot

4.2 Introduction

Land access, through use or ownership rights is a major factor in influencing a households' food security status as well as its vulnerability to shocks (Chamberlin and Ricker-Gilbert, 2016). Moreover, equitable land access has been shown to increase the pace of agricultural growth and reduce poverty among households. In the recent past, most households especially in the pastoralist communities have been accessing land through land markets. These communities live in the dry areas of Kenya, which have traditionally been used and managed by them for their livelihoods through communal property rights-based land tenure system (McDermott et al., 2010).

However, pressure from human population growth and the growth of agriculture into grazing lands has brought major differences in land tenure from communal land control towards more individual holdings. It has also led to land commoditization; involves investing in fencing that allows an individual to grow crops or pasture, get payment from grazing and also lease land to other pastoralists (Flintan, 2011). This phenomenon has given rise to land markets, which allow the land-constrained residents to access land and get a source of livelihood. For instance, a great majority of agro-pastoralists in the Chepareria area have enclosed plots for food and feed production near their houses (Engstrom, 2016). Land markets which are mostly informal, work in traditional settings that are often outside the legal structure. The contractual agreements within the markets whether rentals, sales or even inheritance are not always sanctioned by law.

They have a social importance since they act as an avenue through which rural households access land as reported by Ainembabazi and Angelsen (2016), who found that individuals in Uganda, with less or no land inheritance, used land markets to get access to farm lands.

In comparing land rentals versus sales markets, the former is seen as a better and easier way of transferring land to the poor households since it doesn't require large amounts of capital. The rental arrangements do not need household savings immobilization (Yamano et al., 2009). Moreover, agricultural rental markets could help in increasing households' agricultural income since the unused agricultural land can be utilized properly (Jin and Jayne, 2013; Chamberlin and Ricker-Gilbert, 2016).

Despite the positive effects shown by participation in the land markets, the market is still relatively weak in the chosen Counties. In addition, little is known on the forms of market participation existing and the nature of transactions in these Counties. Given the high levels of poverty in these agricultural- and livestock-dependent rural areas (Kandji, 2006; Makokha et al., 1999), it is important to identify mechanisms for sustainable livelihoods and increased efficiency in overall agriculture. Therefore, this study contributes to the body of knowledge by characterizing the forms of land market participation found in Laikipia and West Pokot Counties respectively.

4.3 Characterization of Households by Demographic and Socio-economic Attributes

As shown in Table 1 below, there were no differences between the participants in the two Counties in terms of age, farming experience and income from farming. Going with the definition of pastoralism as a way of life by WISP, (2010) this shows that most participants started practicing pastoralism after reaching adulthood.

The average tropical livestock units (TLUs) was 18; respondents in Laikipia had a higher TLU than West Pokot. This can be attributed to the fact that Laikipia County has more "*abandoned lands*" where they can freely graze. The Laikipia "*abandoned lands*" are former large-scale ranches that were bought and subdivided, thus creating uneconomical small-holdings which led to the abandonment of agricultural production activities by the majority of the legal owners.

Moreover, due to the high prevalence of conflicts in the area, they tend to keep more herds to cushion themselves against shocks such as diseases and drought (Dinucci and Fre, 2003).

Table 1: Sample Participants Characteristics

Variable	Description	<i>West Pokot</i>	<i>Laikipia</i> (<i>n =114</i>)	<i>Pooled</i> (<i>n = 224</i>)	
Continuous		Mean			t-test
Farm experience	Number of farming years	13	13	13 (9.50)	0.35
TLUs	Tropical livestock units	11	24	18 (30.17)	-3.14*
TT land in use	Total land in use	10	4	7 (9.30)	5.58*
Age	Age of household head in years	45	45	45 (13.90)	0.16
Farm income	Total income from farming	71,050	79,654	75,515 (97803)	-0.63
Off-farm income	Total income from off farm activities	44,347	45,157	44,763(24,623)	-0.14
Categorical		Percentage			X²
Education level	% of those with formal education	77.27	83.33	80.36	1.30
Gender	% of male household head	87.43	71.23	79.02	8.88*
Credit access	% of those who had access to credit	51.00	40.00	45.98	2.96***
Land conflicts	% of those affected by land conflicts	62.15	81.58	72.32	9.93*
Land current use	% of those whose land use had changed from nomadism to agro-pastoralism	62.86	72.67	67.56	5.09**
Food shortages	% of those who had experienced food shortages in the last 12 months	55.45	48.25	51.79	1.16
Marital status	% of those who are married	82.00	85.00	83.00	7.78
Group membership	% of those who belong to a farmers group	61.00	50.00	55.80	3.17*

Notes: Statistical difference between the participants in Laikipia and West Pokot Counties at ***1%, **5% and *10%, respectively.

TLU equivalents for various livestock were considered as: cattle = 1, camels = 1, donkeys = 0.8, goats and sheep = 0.2 and poultry = 0.04 (WISP, 2010).

Source: Survey Data (2018).

The mean total land in use for crop and livestock production was 7 acres but was higher in West Pokot than Laikipia. West Pokot is an area which has embraced the use of enclosures to secure their own pieces of land hence it is characterized by an increase in private property ownership. Moreover, enclosures come with incentives; easy pasture access leading to increased milk production as well as the ability to grow crops and fruits. The surplus can later be sold for extra incomes and hence the need for additional land holdings (Karmebäck et al., 2015). On the other hand, pastoralists in Laikipia are making good use of the extensive grazing lands available, with little or no incentives to manage it. The few enclosures or *bomas* available have been among the few who have managed to contact the landowners (Wade, 2015).

Land conflicts were experienced in both Counties but were more frequent in Laikipia County. This was due to the *abandoned lands* which acted as open grazing lands to pastoralists within and outside the County especially during the dry periods. The conflicts rose when agro-pastoralists fought with the ranchers who have enclosed their pasture. The other main form of conflict in the County was human-wildlife conflict over crops and livestock. The agro-pastoralists suffered mainly from elephant menace, which destroyed their crops during droughts. The crop raiding was more problematic due to its severity rather than frequency. They also lost their small stock like sheep and goats to hyenas and leopards which often sneaked into the livestock sheds at nights.

From the Table 2 below, there is a significant difference in the income levels for the participants' households than the non-participants. Increased market participation among agro-pastoralists' has the potential to increase their incomes and improve their livelihood because it stimulates production (Omiti et al., 2009). A diverse income stream protects the household against shocks. More so, it enhances other resilience indicators since cash income can be converted into assets.

Income also enables households to access basic services such as healthcare and food, all which explain resilience.

Table 2: Sample Participants vs. Non-Participants Characteristics

Variable	Description	<i>Participants</i> <i>n=224</i>	<i>Non-participants</i> <i>(n =112)</i>	
Continuous		Mean		t-test
Farm experience	Number of farming years	13	12	0.99
TLUs	Tropical livestock units	18	13	-0.90***
TT land in use	Total land in use	7	5	-0.93
Age	Age of household head in years	45	46	1.58
Farm income	Total income from farming	84,912	78,252	-0.3624**
Categorical		Percentage		χ^2
Education level	% of those with formal education	80.42	71.32	1.57
Gender	% of male household head	79.00	75.00	4.10
Credit access	% of those who had access to credit	56.43	43.57	2.33***
Land conflicts	% of those affected by land conflicts	55.42	44.48	3.10
Land current use	% of those whose land use had changed from nomadism to agro-pastoralism	62.86	72.67	3.56
Food shortages	% of those who had experienced food shortages in the last 12 months	51.65	48.35	0.08
Marital status	% of those who are married	82.00	85.00	2.78
Group membership	% of those who belong to a farmers group	59.88	40.12	2.01**

Notes: Statistical difference between the participants in Laikipa and West Pokot Counties at ***1%, **5% and *10%, respectively.

TLU equivalents for various livestock were considered as: cattle = 1, camels = 1, donkeys = 0.8, goats and sheep = 0.2 and poultry = 0.04 (WISP, 2010).

Source: Survey Data (2018).

Credit access was higher for the participants since it raises their probability of market participation. This is because credit is likely to ease the financial constraints of farm households and could increase on-farm income. The availability of affordable and reliable credit is important when it comes to production improvement. Credit access helps in making accessible the capital required to carry out the necessary investments in and out of the farm (Mulwa et al., 2015).

Participants were more involved in farmers group. Collective action by farmers can allow stronger negotiating power in the market for both inputs and outputs. It also provides a platform for sharing information that may be supportive in production and even marketing activities. In addition, it is important in reducing transaction costs thus increasing households' access to production and marketing information (Shiferaw et al., 2011).

4.4 Characterization of the Forms of Land Market Participation

The descriptive statistics in Table 3 show higher participation in Laikipia County; more than two-thirds of respondents. This could be attributed to the fact that the County is more of a settlement scheme due to the number of squatters in some areas (CIDP, 2018). Laikipia County has huge tracts of *abandoned lands*, which pastoralists escaping drought from their various areas settle in until drought subsides. In the process, they participated in land markets by renting in pasture and some renting in for cultivation. This is evidenced by the high rates of renting in/out of land together with sales. All this was attributed to the fact that land renting was relatively easier, cheaper and more common with few requirements unlike buying of land in African countries (Holden et al., 2009; Jabu et al., 2017).

The contractual agreement in the rental markets was informal mostly oral agreements, based on mutual trust between the two parties (tenant and landlord). The level of trust between the parties determined how the transaction would take place and agreements on the mode of payment; cash, crop share or livestock. Land fertility and its distance to a road, or a shopping center or a water

source dictated how much one paid for cultivation, while the pasture quality and size determined how much one paid for grazing. This is in line with what Saxer (2014) found in West Pokot County.

Timeline for renting in land in the counties was one year (temporary) since most residents rented in for cultivation, which was one season for annual crops and grazing for less than six months. The main challenge faced in both markets was default and breach of contracts especially in the sales market brought about by dishonoring the contract terms. Double renting in rental markets is an issue most tenants faced. This happened mostly to those who rented land far away from their homesteads. They attributed this action to low levels of trust between them and the landowner as well as poverty (Holden et al., 2009; Saxer, 2014).

Table 3: Main Features of the Land Markets

	West Pokot n = 110	Laikipia n = 114
Percentage of participants	62.86	70.81
Gender of participants (% male)	87.27	71.05
Rentals (% male)	87.36	78.57
Sales (% male)	44.27	53.48
Contracts involved		
Rentals (informal agreements)	79.78	80.68
Sales (informal with witnesses)	50.82	56.34
Timeline		
Cultivation (one year)	55.13	45.45
Grazing (less than one year)	34.09	51.14
Challenges (default and breach of contract)	53.13	43.10
Institutional right over land		
Sales agreement	54.34	30.88
Title deeds	24.51	36.70
Tenure system (ownership without title deeds)	68.29	53.32

Source: Survey Data (2018)

In land sales markets, most transactions were informal but involved witnesses. The process involved the buyer, seller, village elders, and chiefs who would act as witnesses. In areas with title deeds, the process appeared more formal. An applicant had to wait for his/her documents to be taken to Nairobi for land title preparation before formalizing it for collection. In both Counties, majority of the participants had their land privatized but had no title deeds yet. The process of title acquisition was considered to be cumbersome, hence most respondents only had plot numbers/allotment letters. In areas with group ranches especially in West Pokot, sales were possible since each individual knew their boundaries and sale agreements were kept as proof of ownership as they awaited for title deeds issuance.

Tenure security is still an issue in both Counties as evidenced by the low number of title deeds during the survey. This is practically the biggest reason why a majority of the respondents opted for the rental market since no documentation was needed to either rent in or out land. However, this scenario increased the transaction costs since majority of the individuals were not ready to let their land into the market due to the lack of guarantee of ownership.

4.5 Pastoralist's Land-based Enterprises

As shown in Figure 4 below, over three-quarters of the respondents practice crop and livestock production. This is in line with the conventional argument in the literature that pastoralists derive most of their food and income needs from livestock (Alinovi et al., 2010; Opiyo et al., 2014; Little and McPeak, 2014). In addition to livestock keeping, over 90% of the respondents practice crop farming with the common crops being maize, beans, millet, vegetables and sorghum. This has been possible in West Pokot County after the enclosure of land, which led to an increase in production of both crops and livestock (Karmebäck et al., 2015).

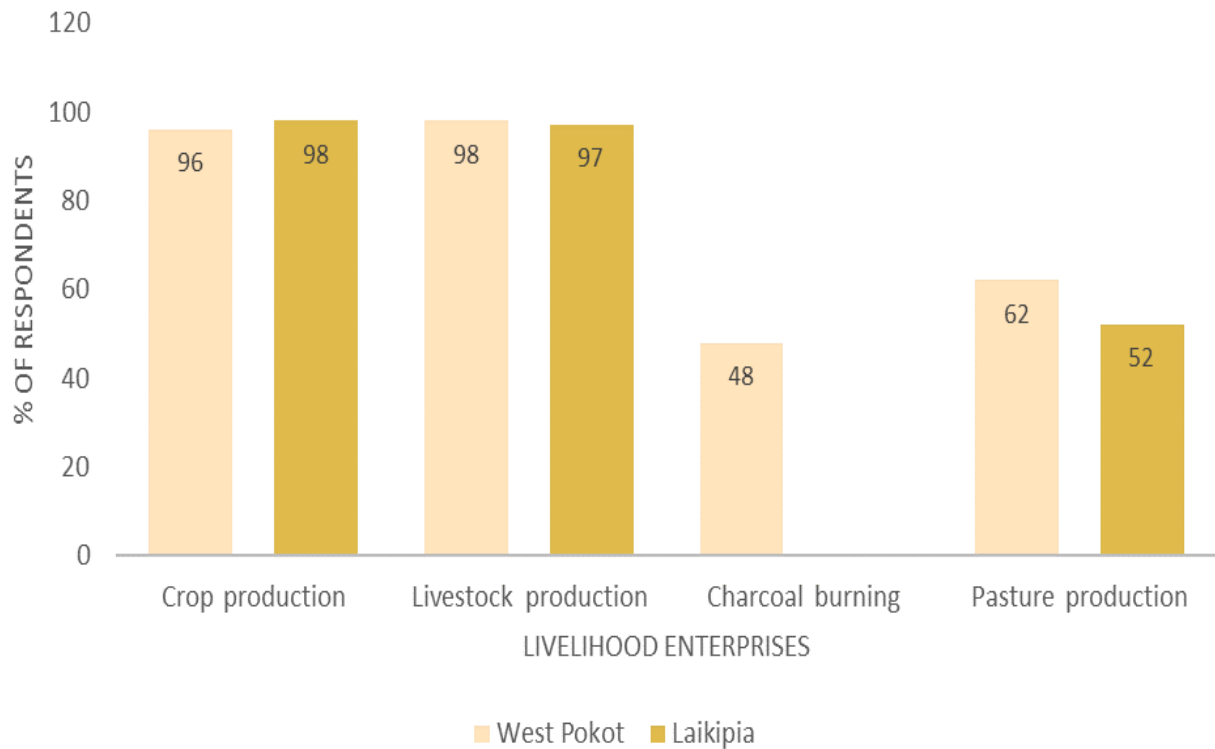


Figure 4: Land-based Livelihood Enterprises

Source: Survey Data (2018).

Pasture production was one of the main livelihood enterprises practiced in both Counties as a way of supplementing the locally available livestock pasture, which can be scarce during the dry season. In West Pokot for instance, individuals who had invested in enclosures were the ones providing pasture at a fee to the other households as a way of diversifying their income sources. Beyene (2010) found that individuals with enclosures in Ethiopia increased their income sources by selling the pasture during the dry period or allowing other households to graze in the enclosure at a fee. This phenomenon is common in areas where pasture productivity has been favored by good climatic conditions and large enclosure sizes as echoed by (Wairore et al., 2015).

In Laikipia County, pasture production including grass and other pasture species was mainly in the ranches. This move is a way of sustaining the livestock within the ranch and in the

surrounding pastoralists' villages during the dry season and through the subsequent seasons. The ranch owner only allowed a certain number of animals to graze at a fee thus limiting the individual who had a big number of animals to graze. The move ensured that overgrazing was reduced and thus saved up pasture for the next stock of animals.

CHAPTER FIVE

5.0 DETERMINANTS OF LAND MARKET PARTICIPATION

5.1 Abstract

Land market transactions in the ASALs by agro-pastoralists have been on the rise mainly due to land scarcity brought by climate variability and the inadequacies in the land distribution system. Its emergence has been in response to the increasing demand for land and to correct variations in factor shares at the farm level. This chapter documents a bivariate probit assessment of agro-pastoralists decisions to rent in/out land. Results show that higher levels of livestock, education level, farming experience, and land sizes increased the likelihood of a household renting in land. The individuals who rented out land had relatively larger land sizes, source of off-farm income and owned livestock especially oxen. Policies that allow for land equalization favouring the arid and semi-arid areas should be put in place. These policies include more investment in education, or rather making education attractive by introducing take-home rations conditional on child's attendance to school. To continue increasing land holdings, policies fastening the land titling should be implemented. This move will strengthen tenure security which enables an agro-pastoral household to have exclusive rights over his/her land and hence enjoy the benefits that come with investments made. The occurrence of off-farm income is an alternative way of acquiring income for most households. County governments, together with development partners should encourage the agro-pastoralists to embrace alternative ways of income sourcing. These sources such as small businesses and trading in livestock products should also complement pastoralism.

Keywords: Land market participation, Agro-pastoralists, Bivariate, Renting in, Renting out

5.2 Introduction

Land in most societies is a means of generating livelihood as well as wealth accumulation and can be transferred between generations. Therefore, a household's ability to produce their subsistence and marketable surplus depends on the possession of secure land rights. It builds resilience by preventing land-takings and reduces forced migration, especially in the ASALs.

In developing countries, markets for land rights exchange are capable of temporarily or permanently allowing low-cost but systematic transactions and productive use of the land (Deininger, 2001). Land markets have an important role in the larger process of economic development. For instance, since land is among the top collateral available, clear property rights and less effort in their exchange are likely to affect the emergence and productivity of financial markets. Land markets, particularly those operating in traditional settings, are an important avenue through which rural households access land. They also lead to the concentration of land in an environment of already acute inequality (Deininger et al., 2003). According to IFAD (2003), market participation regardless of the output has emerged as the key in unlocking a smallholder's productivity thus increasing household incomes and reducing poverty.

In the pastoral areas of Kenya, land markets have been on the rise due to individualization of tenure, which provides the land-scarce agro-pastoralists with a means for obtaining or enlarging their land holdings (Baland et al., 2007). Similarly, it allows the asset-rich agro-pastoralists who are less exposed to shocks to supply land to the market leading to land commoditization in the area. In West Pokot County, the prevalence of land markets has resulted from the adoption of enclosures, which has permitted households to privatize their property and in return sell, rent in/out of land (Nyberg et al., 2015). In Laikipia County, mostly constituted by immigrants, renting of land for cultivation is common near water sources. For the cases of buying and selling, an interested party first identifies and contacts a landowner who wished to sell the land. Despite

the existence of land markets in these areas, little is known about the key factors that influence the decision to rent in/out, sell and buy and the extent of the transactions.

5.3 Analytical Method

The bivariate probit model was applied to estimate factors that drive agro-pastoralists participation in land markets (renting in and out). The model diagnostic reveals that the decisions to rent-in and/or rent out land is significantly correlated. This differs with the estimation of univariate probit (or logit) models which gives biased estimates of the factors of participation in land renting in and renting out. It does not take into consideration the possible correlation between the unobservable (captured by the error terms) of the two decisions. The decision to rent in is dependent on the decision to rent out. The structural form of the bivariate probit model can be expressed as follows;

$$Y^*_{i1} = \alpha_1 Y^*_{i2} + X'_{i1} \beta_1 + \varepsilon_{i1}; Y_{i1} = 1$$

$$if y^*_{i1} > 0; = 0 otherwise (6)$$

$$Y^*_{i2} = \alpha_2 Y^*_{i1} + X'_{i2} \beta_2 + \varepsilon_{i2}; Y_{i2} = 1$$

$$If y^*_{i2} > 0; = 0 otherwise (7)$$

$$E(\varepsilon_{i1}) = E(\varepsilon_{i2}) = 0; Var(\varepsilon_{i1}) = Var(\varepsilon_{i2}) = 1;$$

$$Cov(\varepsilon_{i1}, \varepsilon_{i2}) = \rho \text{ and } i = 1, 2, 3 \dots n (8)$$

The unobservable, perceived utility y^*_{i1} from participation in renting in market depends on a vector of explanatory variables X such that the binary outcome $Y_{i1} = 1$ arises when the latent variable $y^*_{i1} > 0$. On the other hand, y_{i2} (renting out) is observable if and only if y^*_{i2} (renting out) $= 1$.

The empirical model was expressed as follows;

$$Rentin^*_{i1} = \alpha_1 Rentout^*_{i1} + X'_{i1} \beta_1 + \varepsilon_{i1}; Rentin_{i1} = 1$$

$$\text{If } Rentin^*_{i1} > 0; = 0 \text{ otherwise (9)}$$

$$Rentout^*_{i2} = \alpha_2 Rentin^*_{i1} + X'_{i2} \beta_2 + \varepsilon_{i2}; Rentout_{i2} = 1$$

$$\text{If } Rentout^*_{i2} > 0; = 0 \text{ otherwise (10)}$$

$$E(\varepsilon_{i1}) = E(\varepsilon_{i2}) = 0; Var(\varepsilon_{i1}) = Var(\varepsilon_{i2}) = 1;$$

$$Cov(\varepsilon_{i1}, \varepsilon_{i2}) = \rho \text{ and } i = 1, 2, 3 \dots n \text{ (11)}$$

Where $Rentin^*_{i1}$ and $Rentout^*_{i2}$ are latent dependent variables referring to the household's decisions to participate in land renting in and out, respectively.

5.4 Factors Influencing Land Market Participation by Agro-pastoralists

The variables, education level, total land in use, farming experience, off-farm income, land conflicts, group membership and TLUs were statistically significant in determining land market participation. These findings lead to the rejection of the null hypothesis, which states that education level, land size and household assets have no influence on market participation and agree that education level, land size and household assets have a significant influence on land market participation.

From the results shown in Table 4 below, better-educated household heads, that is, those with formal education were more likely to participate in land renting in. Exposure to education gives one the means to discern, interpret and respond to new market information much faster. In addition, their ability to utilize the information will help reduce transaction costs and make it more lucrative to participate in the market (Ricker-Gilbert and Jayne, 2010).

Table 4: Bivariate Probit on the Determinants of Land Rental Market Participation

Variables	Renting in		Renting Out	
	Coefficient	SE	Coefficient	SE
Tropical Livestock Units	0.74***	0.42	-0.72**	2.31
Number of farming years	0.33***	0.21	0.09	0.03
Age(Years)	-0.25**	0.01	-0.02	0.25
Education level	0.70***	0.39	0.66	0.71
Total land in use (Acres)	-0.90**	0.04	1.08**	0.38
Group membership	0.26	0.31	-1.43**	0.62
Log off farm income	0.03	0.22	-1.45**	0.50
Log total farm income	0.19	0.12	-0.13	0.18
Food shortages	0.77	0.25	1.34	0.52
Wald chi2 (18) = 43.40				
Log likelihood = -64.12				
Prob. > chi2 = 0.0000				

Notes: **, * statistical significance of coefficients at 5% and 10% levels, respectively.

Source: Survey Data (2018).

Households with smaller farm sizes had higher chances of renting in land than those with larger land sizes. Due to the rising population and hence demand for food, demand for land is also rising making households with small holdings to rent in land so as to cater for the growing demand. This is consistent with the findings of Nyangena (2010) and Jin and Jayne (2011) who established that land rental markets increased land access for households with fewer holdings. In terms of renting out, households with larger farm sizes tend to rent out land to improve their incomes (Jabu et al., 2017).

Higher levels of livestock and other farm capital assets increase the probability of renting in land. This is because those rich in non-land factors rent in land to increase their farm sizes, to utilize

their extra resources. This is consistent with the findings of Holden et al. (2007), for agro-pastoralists in Ethiopia. In addition, as noted earlier in Table 1, migrants in Laikipia County are more likely to rent in land. On the other hand, households who kept oxen were less likely to rent out land. Such households were wealthier from using the oxen to bring in alternative sources of income. In addition, Holden and Ghebru (2006) noted that such households had to keep land to supply fodder for their livestock.

The ability and chance of earning an off-farm income stimulated the households to rent out land; due to probably lack of time to work on their own farms. This also applied to the households with lower farm income who opted to rent out their land to possibly improve the total household income (Rahman, 2010). The occurrence of off-farm income is an important tool for risk management such that in times of negative shocks like drought, families can rely on off-farm income to maintain their livelihoods (Rapsomanikis, 2015).

Group membership was synonymous to accessing extension services. Most households received extension services by virtue of being in a group. However, it negatively influenced household's decision to rent out land. This is because the extension received boosted the know-how of land utilization. Agro-pastoralists who have had contacts with extension agents have more skills and tend to use the skills to increase production rather than renting out the land (Tikabo and Holden, 2004).

Farming experience was positive and significant. This implies that households with more farming experience were likely to participate in renting in since experience increases awareness on the benefits of land investments. In addition, farming experience may be associated with improved access to market information and social networks. This finding is consistent with those of Vranken and Swinnen (2006) on renting-in land and Swinnen et al. (2006) and Masterson (2007) on renting-out land.

CHAPTER SIX

6.0 EFFECTS OF LAND MARKET PARTICIPATION ON LIVELIHOODS

6.1 Abstract

Participation in land markets is one of the livelihood strategies among the agro-pastoralists in the pastoral areas of Kenya. Promoting market participation among agro-pastoralists will not only enhance their welfare but the development of the whole economy. In addition, proper working land markets have the possibility of providing the households with an opportunity to earn better incomes and hence sustainable livelihoods. There is potentially an important relationship between market participation and poverty in the markets whose products make up household livelihoods. This chapter examined the effect of land market participation on household total income, which was used as a proxy for livelihoods. The Tobit model was used to analyze the effect market participation and other factors had on household farm income. The results showed that apart from market participation, other factors which had a positive and significant influence on household income were education level, type of tenure, tropical livestock units and off-farm income. Market participation was significant implying that a household's farm income increases, with an increase in land market participation. Participating in land markets also helps enhance the food security situation of the agro-pastoral households through renting in and out of land. To encourage more market participation, County governments can respond by improving land rights and educating the households on the rental contracts available. In addition, making information on rental prices more available will encourage a more open and competitive land market.

Tenure type (private ownership), significance implied that having a secure tenure would probably improve a household's livelihood. Provision of tenure security improved productivity since households have more incentives and better ability to invest due to lower perceived risks. It is expected to reduce the incidence of land disputes, thus releasing resources that would have

been used for legal contests. In addition, it increases agro-pastoralists confidence to supply their land to land markets.

Keywords: Land, Household income, Tobit model.

6.2 Introduction

According to Lerman (2004), well-functioning markets lead to an efficient allocation of and the maximization of the society's welfare by exploiting comparative advantages. In addition, market participation has the potential of enhancing the household's income if constraints such as lack of capital, high transaction costs, and lack of information can be reduced. Households with a high degree of market engagements and non-land factors such as livestock have the potential of reducing the risks of food insecurity and enjoying better standards of welfare (Gebreselassie and Sharp, 2007).

According to Chamberlin and Ricker-Gilbert (2016), land market participation acts as an avenue for income diversification for the land rich. In the cases of agricultural production, it has allowed maximum use of under-utilized land consequently increasing household's income and output respectively (Jin and Jayne, 2013). In these areas, land is the primary asset for wealth creation and hence the strong association between land access and household income, making land distribution the primary focus of poverty reduction (Jayne et al., 2003; Muyanga and Jayne, 2014).

Agro-pastoralists as such, are participating more in rental markets since they do not need credit to enter due to its small capital requirements. In addition, they require no savings immobilization due to the existence of a wide range of rental arrangements which do not involve the use of cash (Yamano et al., 2009). Land market participation generally improves household livelihoods since one can decide to rent in land to sustain livestock or cultivate crops for sale. Some rent out their land to support themselves through financial ways rather than putting the land for subsistence use. Despite such evidence on the market participation effects, little has been documented on

how it influences the household farm income. This is the knowledge gap that is addressed in this chapter.

6.3 Analytical Method

The Tobit model was applied to analyze the effect of market participation on household income. The suitability of this approach stems from the fact that the dependent variable was censored to correct for many outliers observed in the data at both extremes; too little and too high income. The dependent variable was censored from below and above; a lower limit of 6,000 and an upper limit of 13 all in logarithmic form. Following Greene (2008) the model was specified as:

$$y^* = \alpha X_i + \varepsilon_i \dots\dots\dots (12)$$

where y^* is a latent variable (unobserved for values <1 and >5), α is a vector of coefficients to be estimated, ε_i is a vector of independently normally distributed error terms with zero mean and constant variance σ^2 , X_i is the vector of explanatory variables and $i = 1, 2, \dots, n$.

The explanatory variables used in the estimation of the model were market participation, household size, education level, group membership, age, type of tenure, off-farm income, tropical livestock units, land conflicts, years of farming and land use changes.

6.4 Effects of Land Market Participation on Household Total Income

As shown in Table 5, participating in land markets increases a household's total farm income. Land market participation in itself is an income diversification venture. According to Kimenju and Tschirley (2009), the desire to increase income and manage risks, pushes a rural household to diversify. Paul et al (2015), reported that diversification is a strategy employed by households to reduce vulnerability in the face of environmental change. Land market participation favored the households who rented out their land. The rental payment earned could be invested in other off-farm ventures hence enhance the households farm income (Jabu et al, 2017).

Table 5: Tobit Results on Effects of Land Market Participation on Household Income

Variables	Coefficients	S.E	P>z
Market participation	0.65	0.19	0.02**
Household size	0.02	1.01	0.43
Education level	0.36	0.19	0.06***
Group membership	-0.14	0.14	0.33
Age	0.00	0.00	0.49
Tenure type	0.16	0.09	0.07***
Off farm income	0.15	0.15	0.01**
Tropical Livestock Units	0.49	0.11	0.04**
Land conflicts	0.31	0.17	0.27
Years of farming	0.12	0.99	0.19

Pseudo R2 =51.5
Prob > chi2 =0.000
Log likelihood = -39.6

Notes: **, * statistical significance of coefficients at 5% and 10% levels, respectively.

Source: Survey Data (2018).

Better educated households have ways of diversifying on their farms to increase farm income. This corroborates what Randela et al. (2008) found that better educated households had the ability to process information and hence have creative and innovative ideas to put on their farms; and possibly contribute to increased income. Indirectly, with the skills acquired from education, agro-pastoralists are able to engage in non-farm sector activities, which serves as an alternative source for household farm income (Oduro et al., 2014).

Private land ownership with title deeds was significant, implying that households with privatized tenure had the right to use land (security of tenure). Moreover, they can use their land as collateral to secure loans, which can be channeled to the necessary land investments. This is consistent with the findings of Rana et al. (2000). In addition, the private tenure in this area is seen as a catalyst for market-based agro-pastoral system transformation (Catley et al., 2013).

Households with an off-farm income had the ability to channel the income to farm activities and other farm improvements thus improving the farm income. This finding is consistent with the explanation of Stifel (2010) that showed a positive correlation between household welfare and their involvement in non-farm activities. Anang and Yeboah (2019) also showed that income from off-farm activities acts as a substitute income source to finance farm production. Off-farm activities tend to lessen income unreliability. As noted by Senadza (2012) income diversification assists households in smoothening income through risk spreading across different activities. The income uncertainty reduction creates opportunities to invest in enhanced production technologies thus boosting agricultural production.

Total farm income increases as livestock ownership increases; since some households might sell the livestock (live animals) as well as its products (milk, manure, hides and skin) to meet unforeseen expenses (Jabbar and Ayele, 2003). In other cases of oxen ownership, the household might hire out to other households in a bid to make an additional income. Little et al. (2001) found that beneficial income diversification is likely to be based on initial capital generated by livestock sales. This implies that livestock markets and price levels have a very important impact on the welfare of livestock keepers. This has been made possible by the devolved governance, which has led to easier access to veterinary services and livestock feeds among others. This has greatly improved the livestock quality and quantity and in turn, increased their market values. From the findings, the null hypothesis that market participation has no influence on household

income is rejected and reach a decision that land market participation has a significant influence on household income.

CHAPTER SEVEN

7.0 EFFECTS OF LAND-RELATED CONFLICTS ON LAND USE

7.1 Abstract

Land conflicts among pastoral communities are becoming frequent in Laikipia and West Pokot. The resulting situation calls for immediate actions since the root causes of these conflicts have become more complex and multi-dimensional, ranging from socio-economic, cultural to even environmental factors. This study provides an analysis of the effect land conflicts had on the percentage of land in use in Laikipia and West Pokot Counties.

The study established that apart from land conflicts, size of the household, group membership, and both farm/off-farm income had an influence on the percentage of land in use. The results show that the occurrence of land conflicts had a significant negative influence on the proportion of land put in use. Given the environment of high household poverty and shrinking land sizes, the effectiveness of land disputes resolution systems appears as a proper policy to implement. Such policies include good land governance and increasing land rights among the community members.

Secondly, encouraging the role of social capital in form of networks such as group membership, can be used to access market information and even credit probably to be used to add land holdings. This can be achieved by encouraging the formation and involvement in small farming, women or livestock trading groups. Such groups empower most households since they are able to overcome socio-economic barriers.

Keywords: Land conflicts, Agro-pastoralism, Land use, Welfare.

7.2 Introduction

Conflict occurs when two or more parties believe that their interests are incompatible. In most developing countries, where the economies still rely on agriculture, conflicts are prevalent due to diminishing agricultural land (Von Uexkull and Pettersson, 2013). In addition, how land is owned and accessed shows how power is held since ownership depends on the political and economic effect in these societies (Kanyinga, 2009a). Furthermore, the individuals participating in the conflicts are those whose livelihood depend on land and have little or no attractive outside options. Lynn (2011) adds that conflicts occur mainly because of a group's strong feeling of belonging and ownership to a particular land. They identify themselves as being indigenous to an area and to have an obvious attachment to a specific land that others do not enjoy; making the land a source or identity rather than an economic resource. Conflicts are now widespread in the arid and semi-arid zones, and often overlap with extreme food insecurity.

In Kenya for instance, land is increasingly becoming a source of conflicts in the productive areas, but the condition is worse in the ASALs where poorly established tenure rights have incited clashes over access, ownership and control of grazing lands (Opiyo et al., 2012). Over a century ago, pastoralists grazed on a wide area of their plateaus. However, due to land use changes, the majority of these areas are now used for mixed farming and ranching, thus eliminating the important safety net of the pastoralists during dry seasons. Pastoralists are now crowded into marginal lands with little or no access to adequate grazing areas for the dry season (Huho et al., 2011). These and other factors are threatening the pastoral survival way of life. In response to these changes, and as a means of gaining control of pasture and water, violent clashes become the only solution in such areas (Opiyo et al., 2012).

Despite pastoralism being the main means of livelihood in the ASALs, some areas like Laikipia and West Pokot have diversified into other forms of livelihoods. Mixed farming and agro-pastoralism are the major livelihood forms, which households have adopted in the areas.

Households in such livelihoods have not been spared from the conflicts either, for instance, farmers and herders fighting over animals trespassing and destroying crops or human-wildlife fights over crop and livestock destruction. Conflicts affect the well-being of pastoral communities in various direct and indirect ways. The most direct ones include loss of human lives, loss of livestock due to deaths and raiding, and the loss of homes and resources (Schilling et al., 2012).

In terms of loss of resources, land loss is a major one since most households flee conflict situations, abandoning their farms due to insecurity. People desert their homes or the areas believed to be too dangerous and in both short and long term period, food security and general economic productivity is compromised (Opoku, 2015). In addition, they limit the investment that agro-pastoralists make on their land. Despite the concerns, little research has been conducted on the link between land conflicts occurrence and land use, and hence this study offers some empirical insights.

7.3 Analysis of Data

A multiple linear regression model was fitted to determine the effects of land conflicts and other variables on the percentage of land in use. The equation was specified as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \dots \dots \dots + \varepsilon_1 \dots \dots \dots (13)$$

where Y = response variable (percentage of land in use), and ε is random error term. The independent variables included in the model were: land conflicts, age, farm income, off-farm income, education level, tropical livestock units, group membership, household size, farming experience, access to credit, possession of title deed and type of tenure.

7.4 Effects of Land Conflicts on Percentage of Land in Use

From the results in Table 6 below, land conflicts variable was significant and negative showing that land in use decreases as land-related conflicts increase. Land conflicts of any type have the potential of keeping a piece of land under-utilized or unused completely. Such conflicts also undermine the incentives to invest in land and consequently on agricultural productivity. In addition, land productivity is reduced due to constrained crop and livestock choices and general farm care (Muyanga and Gitau, 2013).

Table 6: Multiple Regression Results of the Effects of Land Conflicts on Percentage of Land in Use

Variable	Coefficient	S.E	P>t
Land conflicts (experienced or not)	-0.15	0.01	0.03**
Education level	2.62	2.23	0.28
Tropical Livestock Units	0.11	0.04	0.07***
HH size	1.31	0.16	0.02**
Tenure type(private ownership)	0.77	1.40	0.58
Age	-0.03	0.07	0.24
Title deed possession	1.49	0.05	0.23
Farm income	0.05	0.09	0.01**
Group membership	0.09	0.02	0.08***
Farming years	0.07	0.13	0.57
Credit access	2.81	1.86	0.13
Off-farm income	-0.16	0.02	0.06***
Adjusted R-squared	0.46		
Root MSE	7.92		
Prob>F	0.000		

Notes: ** and * refer to statistical significance level at 5% and 10%, respectively.

Source: Survey Data (2018).

Total land in use increases as the number of livestock kept increase. Being pastoralists and livestock the major source of livelihood and wealth, an increase in livestock numbers means more grazing space for livestock. The need to increase land size is fueled by the decreasing land for grazing as well as the increasing uptake of crop-based regimes (Wairore et al., 2015). This is consistent with what Holden and Ghebru (2006) noted that households with more livestock needed to keep land so as to cater to their livestock needs.

Household size was significant and positive implying that land in use tends to increase with an increase in household size. Larger households mean more demand for food, school fees and hence the need to increase the land size to cater for such expenses. Moreover, large families imply more labor availability, which ensures the utilization of all available land. This is consistent with what Doti (2017) found in Ethiopia, that households with large family size had large farm size since it was one criterion by which government distributed land and increased their farm size through lease arrangements.

Land in use increases as total income from farming increases. Returns from the land provide incentives for a household to increase the percentage of land to use for the next season. In addition, it can open up other livelihood options, which can be undertaken by women such as poultry production to sustain the household (Duangbootsee, 2018; Nyberg et al., 2015).

The availability of off-farm income significantly reduces the percentage of the land in use. Increasing incomes from off-farm sources would decrease the possibility of increasing the land. This can be attributed to the possibility that as off-farm income increases households pursue other opportunities such as investing in businesses like small shops, and will not exit from pastoralism completely due to the strong cultural attachment to livestock in the area (Little, 2001; Mochabo et al., 2006). From the findings, the null hypothesis that land-related conflicts and institutional factors do not affect the proportion of land used productively is rejected and

come to an agreement that land conflicts and institutional factors do affect the land used productively.

CHAPTER EIGHT

8.0 GENERAL CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

The study analyzed the determinants of agro- pastoralist's participation in emerging forms of land market participation and the effects of their livelihoods. The specific objectives were to: characterize the forms of land market participation and land-based livelihoods; analyze the determinants of renting in/out, selling and buying of land; assess the effect of renting in/out, selling and buying of land on household income and to analyze the effect of land-related conflicts and institutional factors on proportion of land used.

From the findings, both land sales and rental markets were present but rentals were more common than sales. Sales only occurred when a household was in distress conditions such as the need for medical bills and school fees. Moreover, sales were difficult since the majority of the households had no title deeds making sales almost impossible. Rental markets met the respondent's needs since it required little capital and no contracts to acquire land through it.

Farming experience, tropical livestock units, income from farming, education level of the household head, and land size influenced the decision to rent in land. On the other hand, land size, group membership, tropical livestock units and off-farm income influenced one to rent out land.

In analyzing the effect of land market participation on household income, results showed that market participation was significant. Other variables considered were education level, title deed possession and tropical livestock units and these were significant on the household total farm income. Increased participation in the land markets increased household incomes since it is a

form of income diversification by agro-pastoralists. Diversification allows households to access new sources of income that complement pastoralism.

Land conflicts negatively influenced the land in use. The institution factors considered were group membership, credit accessibility, possession of title deed and the type of tenure. Group membership, household size, and off-farm income were significant and positive on the percentage of land in use.

8.2 Recommendations

In order to establish an efficient and vibrant land market, the County governments through the national land commission should improve on tenure security. This can be achieved by lowering the land registration fees of title deed acquisition. Title deeds provide a sense of ownership allowing the household to trade with his/her own land or still diversify within the farm with less risk thus improving production. Furthermore, it will encourage trust among the trading partners i.e. tenant and landlord thus reducing the transaction costs.

Educational achievement has been shown to be a crucial determinant for the involvement in land rental markets and other remunerative non-farm activities; in a bid to increase household income. Households with some form of education are better off in terms of income and food security. Education access, which is still low in the pastoral areas, should be made attractive by improving the existing incentives like school feeding programs.

In addition, construction of new schools and encouraging boarding facilities for the nomadic families. For the secondary school goers, an increase in allocation of school bursaries especially for the poor households will be essential. For the adults who missed on both primary and secondary education, there is a need for sensitization programs on the importance of adult education. For those able to attend the adult classes, there should be lunch provision as a means of motivating them. Therefore to encourage agro-pastoralists to pursue education, policies

supporting mobile schools can be introduced. This will put into consideration the seasonal nature of the pastoral communities.

In the event of land conflicts, which in most cases result in food shortages, most agro-pastoralists are unable to bounce back. Policies which will allow long-term conflict resolution such as peacebuilding initiatives like sports, or institutions guiding territorial grazing access should be implemented. The integration of customary and statutory institutions enabling equitable resource sharing should be encouraged especially in negotiating the cross-territorial grazing access during the periods of scarcity. There is a need to involve the local people in the policy-making process so as to generate relevant and practical policies since they are the ones who understand the causes of their conflicts better.

Apart from traditional institutions, the support of external actors should be embraced. For instance, the churches and NGOs should be in the leading role of preaching peace and harmonious co-existence in the areas. Furthermore, if possible, these two counties have high tourist potential. It is an opportunity for the community to be trained in tourism activities as an alternative income generating activity apart from pastoralism.

Given the existence of non-market transactions of accessing land such as inheritance and allocation by village chiefs, majority of the pastoralists may not use land rentals and sales markets. Therefore, better knowledge of the potentials and limitations of non-market ways would be of great attention. Further research on the comparison of land markets in various ASAL counties would provide information on their limitations and better ways of improving their potential.

9.0 REFERENCES

- Alene, A., Manyong, V., Omany, G., Mignouna, H., Bokanga, M., and Odhiambo, G. (2008). Smallholder market participation under transactions costs: Maize supply and fertilizer demand in Kenya. *Food policy*, 33(4), 318-328.
- Ainembabazi, J., and Angelsen A., (2016). “Land Inheritance and Market Transactions in Uganda.” *Land Economics*, 92(1), 28-56.
- Alinovi, L., D’Errico, M., Mane, E., and Romano, D. (2010). Livelihoods strategies and household resilience to food insecurity: An empirical analysis to Kenya. *Conference organized by the European Report of Development, Dakar, Senegal, June* (pp. 28-30).
- Anang, B., and Yeboah, W. (2019). Determinants of Off-Farm Income among Smallholder Rice Farmers in Northern Ghana: Application of a Double-Hurdle Model. *Advances in Agriculture*, 2019, 1-7
- Araujo, C., Bonjean, C., Combes, J., Motel, P., and Reis, E. (2009). Property rights and deforestation in the Brazilian Amazon. *Ecological Economics*, 68(8-9), 2461-2468.
- Asfaw, S., Shiferaw, B., Simtowe, F., and Haile, M. (2011). Agricultural technology adoption, seed access constraints and commercialization in Ethiopia. *Journal of Development and Agricultural Economics*, 3(9), 436-477.
- Asfaw, S., Shiferaw, B., Simtowe, F., and Lipper, L. (2012). Impact of modern agricultural technologies on smallholder welfare: Evidence from Tanzania and Ethiopia. *Food Policy*, 37(3), 283-295.
- Baland, J., Gaspart, F., Platteau, J., Place, F., (2007). The distributive impact of land markets in Uganda. *Economic Development and Cultural Change*. 55 (2), 283–311.

- Beyene, F. (2010). Locating the adverse effects of rangeland enclosure among herders in eastern Ethiopia. *Land Use Policy* 27(2), 480–488.
- Bizimana C. (2011). Determinants of land rental markets: Theory and econometric evidence from rural Rwanda. *Journal of Development and Agricultural Economics*, 3(4), 183-189.
- Blench, R. (2001). *'You Can't Go Home Again': Pastoralism in the New Millennium* (p. 103). London: Overseas Development Institute.
- Blench, R. (2004). Natural resource conflicts in North-Central Nigeria. A handbook and case studies. Mandaras Publishing, London.
- Bob, U. (2010). Land-related conflicts in sub-Saharan Africa. *African Journal on Conflict Resolution*, 10(2), 49-64.
- Bogale, A., Taeb, M., and Endo, M. (2006). Land ownership and conflicts over the use of resources: implication for household vulnerability in eastern Ethiopia. *Ecological Economics*, 58(1), 134-145.
- Boughton, D., Mather, D., Barrett, C., Benfica, R., Abdula, D., Tschirley, D., and Cunguara, B. (2007). Market participation by rural households in a low-income country: An asset based approach applied to Mozambique. *Faith and Economics*, 50(2007), 64-101.
- Carter, M., and Yao, Y. (2002). Local versus global Separability in agricultural household models: The factor price equalization effect of land transfer rights. *American Journal of Agricultural Economics*, 84(3), 702-715.
- Catley, A., Lind J., and Scoones I. (eds) (2013). Pathways to sustainability: Pastoralism and development in Africa. Dynamic change at the margins. London/ New York: Routledge, 1-26.

- Chamberlin, J. and Ricker-Gilbert, J. (2016). Participation in rural land rental markets in Sub-Saharan Africa: Who benefits and by how much? Evidence from Malawi and Zambia. *American Journal of Agricultural Economics* 98 (5), 1507-1528
- Chilundika, N. (2011). Market participation of bean smallholder farmers in Zambia: a gender based approach. *Research report presented to the Department of Agricultural Economics and Extension Education University of Zambia.*
- County Government of Laikipia (2018). First County integrated development plan 2018-2022.
- County Government of West Pokot (2018). First County integrated development plan 2018–2022.
- Deininger, K. (2003). Land markets in developing and transition economies: Impact of liberalization and implications for future reform. *American Journal of Agricultural Economics*, 85(5), 1217-1222.
- Deininger, K., & Binswanger, H. (2001). The Evolution of the World Bank's Land Policy 'in Alain de Janvry et al. *Access to Land, Rural Poverty and Public Action*, 407, 418-19.
- Deininger, K., and Jin, S. (2005). The potential of land rental markets in the process of economic development: Evidence from China. *Journal of Development Economics*, 78(1), 241-270.
- Deininger, K., and Byerlee, D. (2011). *Rising global interest in farmland: Can it yield sustainable and equitable benefits?* World Bank Publications.
- Deininger, K., Ali, D., and Alemu, T. (2008). *Assessing the functioning of land rental markets in Ethiopia.* The World Bank.
- Deininger, K., Jin, S., and Nagarajan, H. (2008). *Efficiency and equity impacts of rural land rental restrictions: Evidence from India.* The World Bank.
- Deininger, K., Hilhorst, T., and Songwe, V. (2014). Identifying and addressing land governance constraints to support intensification and land market operation: Evidence from 10 African countries. *Food Policy* 48, 76-87.

- Demeke, L., and Haji, J. (2014). Econometric analysis of factors affecting market participation of smallholder farming in Central Ethiopia. *Journal of Agricultural Economics, Extension and Rural Development*: 2(6), 094-104.
- de Schutter, O. (2011). How not to think of land-grabbing: three critiques of large-scale investments in farmland. *The Journal of Peasant Studies* 38(2), 249-279.
- Dinucci, A., and Fre, Z. (2003). Understanding the indigenous knowledge and information systems of pastoralists in Eritrea. *Communication for Development Case Study (FAO)*.
- Doti, A. (2017). Causes and Effects of Land Size Variation on Smallholder's Farm-Income: The Case of Kombolcha District of East Hararghe, Oromia, Ethiopia. *Open Access Library Journal*, 4(1), 1-16.
- Duangbootsee, U. (2018). The Land Rental Market in Thai Agriculture and Its Impact on Household Welfare. Conference paper presented in the 30th International Conference of Agricultural Economists, July28-August 2, 2018. Vancouver
- Engström, F. (2016). Breeding and herd structure in livestock-based agro-pastoralism systems in Chepareria, West Pokot, Kenya. Master's Thesis, Swedish University of Agricultural Sciences.
- Elhadi, A., Nyariki, D., Wasonga, V., and Ekaya, W. (2012). Factors influencing transient poverty among agro-pastoralists in semi-arid areas of Kenya. *African Crop Science Journal*, 20(1), 113 - 122.
- Rapsomanikis, G. (2015). The economic lives of smallholder farmers: An analysis based on household data from nine countries. FAO. Rome.
- FAO (2016). Improving governance of pastoral lands. Implementing the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security. Governance of Tenure Technical Guide 6.

- Flintan, F. (2011). The political economy of land reform in pastoral areas: lessons from Africa, implications for Ethiopia. *Future Agricultures, IDS University of Sussex*.
- Freeman, H., Kaitibie, S., Moyo, S. and Perry, B. (2008). Livestock, livelihoods and vulnerability in Lesotho, Malawi and Zambia: Designing livestock interventions for emergence situations. ILRI, Research report 8. ILRI, Nairobi, Kenya.
- Gebre, A. (2009). When pastoral commons are privatized: resource deprivation and changes in land tenure systems among the Karrayu in the Upper Awash Valley Region of Ethiopia. In Svein Ege, Harald; Birhanu Teferra Aspen & Shiferaw Bekele (Hg.): *Proceedings of the 16th International Conference of Ethiopian Studies, Bd (2, 283-297)*.
- Gebreselassie, S. (2006). Intensification of smallholder agriculture in Ethiopia: options and scenarios. In *Future Agricultures Consortium Meeting at the Institute of Development Studies (20-22)*.
- Geutjes, L. (2015). Coping with climate variability in West Pokot, Kenya: The influences of land use on responses to climate variability, by pastoralist and agro-pastoralist communities in arid and semi-arid areas of West Pokot, Kenya. Master's Thesis, University of Gothenburg
- German, L., Schoneveld, G. and Mwangi, E. (2013). Contemporary processes of large-scale land acquisition in Sub-Saharan Africa: legal deficiency or elite capture of the rule of law? *World Development* 48, 1-18.
- Goetz, S. J. (1992). A selectivity model of household food marketing behavior in Sub-Saharan Africa. *American Journal of Agricultural Economics*, 74(2), 444-452.
- Greiner, C., Alvarez, M., and Becker, M. (2013). From cattle to corn: attributes of emerging farming Systems of Former Pastoral Nomads in East Pokot, Kenya. *Society and Natural Resources*, 26(12), 1478-1490.

- Greiner, C., and Mwaka, I. (2016). Agricultural change at the margins: Adaptation and intensification in a Kenyan drylands. *Journal of Eastern African Studies*, 10(1), 130-149.
- Greene, W. (2008). Functional forms for the negative binomial model for count data. *Economics Letters*, 99(3), 585-590.
- Gujarati, D (2003). Basic Econometrics. Fourth Edition.
- Gumbo, D., and Maitima, J. (2007). *Land Use changes in Sub-Saharan*. Book Chapter In: Luanne Otter (ed.) Global Climatic Changes and their impacts on Africa, a synthesis perspective IGBP START Publication. East African Educational Publishers. ILRI, Nairobi, Kenya.
- Holden, S. and Bezabih, M., (2008). Gender and land productivity on rented land in Ethiopia. In: Holden, S. T., Otsuka, K. and Place, F. (Eds.), *The Emergence of Land Markets in Africa: Assessing the Impacts on Poverty, Equity and Efficiency*, pp.179-98.
- Holden, S., Deininger, K., and Ghebru, H. (2009). Impacts of low-cost land certification on investment and productivity. *American Journal of Agricultural Economics*, 91(2), 359-373.
- Holden, S., and Ghebru, H. (2013). Welfare impacts of land certification in Tigray, Ethiopia. In: Holden, S. T., Otsuka, K. and Deininger, K. (Eds.), *Land Tenure Reform in Asia and Africa: Assessing Impacts on Poverty and Natural Resource Management*. London: Palgrave Macmillan, pp. 137-161.
- Holden, S., and Ghebru, H. (2005). Kinship, transaction costs and land rental market participation. *Department of Economics and Management, Norwegian University of Life Sciences*.
- Holden, S., Deininger, K., and Ghebru, H. (2011). Tenure insecurity, gender, low-cost land certification and land rental market participation in Ethiopia. *The Journal of Development Studies*, 47(1), 31-47.

- Horppila, J., and Peltonen, H. (1992). Optimizing sampling from trawl catches: contemporaneous multistage sampling for age and length structures. *Canadian Journal of Fisheries and Aquatic Sciences*, 49(8), 1555-1559.
- Hughes, L. (2005). Malice in Maasailand: The historical roots of current political struggles. *African Affairs*, 104(415), 207-224.
- Huho, J., Ngaira, J., and Ogindo, H. (2011). Living with drought: the case of the Maasai pastoralists of Northern Kenya. *Educational Research*, 2(1), 779-789.
- IFAD (International Fund of Agricultural Development) (2003). "Promoting market access for the rural poor in order to achieve the millennium development goals." Discussion Paper. Rome.
- Jabbar, M., & Ayele, G. (2004). Livestock marketing, food security and related issues in Ethiopia, Proceedings of a Policy Forum, 610(2016-40404), 145-165.
- Jagwe, J. (2011). The impact of transaction costs on the participation of smallholder farmers and intermediaries in the banana markets of Burundi, Democratic Republic of Congo and Rwanda (Doctoral dissertation, University of Pretoria).
- Jari, B., and Fraser, G. (2009). An analysis of institutional and technical factors influencing agricultural marketing amongst smallholder farmers in the Kat River Valley, Eastern Cape Province, South Africa. *African Journal of Agricultural Research*, 4(11), 1129-1137.
- Jin, S., and Jayne, T. (2013). Land rental markets in Kenya: implications for efficiency, equity, household income, and poverty. *Land Economics*, 89(2), 246-271.
- Jin, S., and Jayne, T. (2011). Impacts of land rental markets on rural poverty in Kenya. Paper prepared for the Agricultural and Applied Economics Association's 2011 AAEA and NAREA joint annual meeting, Pittsburgh, PA.

- Kagwanji, P. (2009). *Ethnicity, land and conflict in Africa: The cases of Kenya, Uganda, Tanzania and Rwanda*. Nairobi, Africa Policy Institute Working Paper Series.
- Kandji, S. (2006). *Drought in Kenya: Climatic, Economic and Socio-Political Factors*. <http://worldagroforestry.org/downloads/Publications/PDFS/NL06291.pdf>
- Kanyinga, K. (2009). The legacy of the white highlands: Land rights, ethnicity and the post-2007 election violence in Kenya. *Journal of Contemporary African Studies*, 27(3), 325–344.
- Karmebäck, V., Wairore J., Jirström M., and Nyberg G. (2015). Assessing gender roles in a changing landscape: diversified ago-pastoralism in drylands of West Pokot, Kenya. *Pastoralism: Research, Policy and Practice*. 5(1), 21-29.
- Barrows, R., and Kisamba-Mugerwa, W. (1989). Land tenure, access to land, and agricultural development in Uganda. Working paper, Land Tenure Center, University of Wisconsin–Madison.
- Kimenju, S., and Tschirley, D. (2009). *Agriculture and livelihood diversification in Kenyan rural households* Nairobi: Tegemeo Institute of Agricultural Policy and Development; 2009. (No. 680-2016 46739).
- Kok, A., Lotze W. and Jaarsveld S. (2009). Natural Resources, the environment and conflicts. African Center for the Constructive Resolution of disputes (ACCORD).
- Kung, J. (2002). Off-farm labor markets and the emergence of land rental markets in rural China. *Journal of Comparative Economics*, 30(2), 395-414.
- Laikipia Wildlife Forum. (2013). The Contribution of the Rural Economy of Laikipia as the Basis of Model County. LWF, Nanyuki, Kenya.
- Lambin, E., Geist, H., and Lepers, E. (2003). Dynamics of land-use and land-cover change in tropical regions. *Annual Review of Environment and Resources*, 28(1), 205-241.

- Lapar, M., Holloway, G., and Ehui, S. (2003). Policy options promoting market participation among smallholder livestock producers: a case study from the Philippines. *Food Policy*, 28(3), 187-211.
- Lerman, Z. (2004). "Policies and Institutions for Commercialization of Subsistence Farms in Transition Countries." *Journal of Asian Economics*, 15(3), 461-479.
- Lesschen, J., Verburg, P., and Staal, S. (2005). *Statistical methods for analyzing the spatial dimension of changes in land use and farming systems*. International Livestock Research Institute.
- Letai, J., and Lind, J. (2013). Squeezed from all sides: changing resource tenure and pastoralist innovation on the Laikipia Plateau, Kenya. In *Pastoralism and Development in Africa* (pp. 185-197). Routledge.
- Little, P. (2001). *Income diversification among East African pastoralists*. Research brief 01-08 PARIMA.
- Little, P., and McPeak, J. (2014). Resilience and pastoralism in Africa South of the Sahara. *Resilience for food and nutrition security*, 75.
- Lynne, S. (2010). The Pastoral to Agro-Pastoral Transition in Tanzania: Human Adaptation in an Ecosystem Context. Graduate Degree Program in Ecology. Fort Collins, Colorado State University. PhD, 312.
- Mahoney, R., Dale, P., and McLaren, R. (2007). Land Markets-Why are they required and how will they Develop? *International Federation of Surveyors, Article of the Month*.
- Majeke, A. (2005). The role of traditional leaders in land tenure: The original legal and traditional framework. *Paper presented at the conference on land tenure in Durban, South Africa*.

- Makhura, M., Kirsten, J., and Delgado, C. (2001). Transaction costs and small holder participation in the maize market in the Northern Province of South Africa. Seventeenth Eastern and Southern Africa Regional Maize Conference, 11th -15th February.
- Makokha, W., Lonyakou, S., Nyang, M., Kareko, K., Holding, C., Njoka, J., and Kitanyi, A.(1999).*We work together–Land rehabilitation and household dynamics in Chepareria Division, West Pokot District.*
- Martey, E., Al-Hassan, R. M., Kuwornu, J. (2012): Commercialization of smallholder agriculture in Ghana: A Tobit regression analysis. *African Journal of Agricultural Research*, 7(14) 2131-2141
- Masterson, T. (2007). Land rental and sales markets in Paraguay. The levy economics Institute, Annandale-on-Hudson, New York, USA. Ministry of Lands and Settlement (2004). National Land Policy Formulation Process Paper. Mimeo. Nairobi.
- Mbudzyaa, J., Ayuyaa, O. and Mshengaa, P. (2017). Drivers of small scale farmers' participation in agricultural land rental markets in Kenya. *African Journal of Rural Development*, 2 (4), 505-516.
- McDermott, J, Staal S, Freeman H, Herrero M, and Van de Steeg J. (2010). Sustaining intensification of smallholder livestock systems in the tropics. *Livestock Science*, 130(1-3), 95–109.
- Mochabo, M., Murilla, G., Nyamwaro, S. and Wanjala, K. (2006). Conflict minimizing strategies on natural resource management and use: The case for managing and coping with conflict between wildlife and agro-pastoral production resources in Trans Mara district, Kenya. Policy Research conference on pastoralism and poverty reduction in East Africa, Nairobi. Kenya
- Mulwa, C., Marenya, P., Rahut, D., and Kassie, M. (2015). Response to Climate Risks among Smallholder Farmers in Malawi: A Multivariate Probit Assessment of the Role of

Information, Household Demographics and Farm Characteristics. Adoption Pathways Project Discussion Paper 3, February 2015.

Muyanga, M., and Gitau, R. (2013). Do land disputes affect smallholder agricultural productivity? Evidence from Kenya. *Journal of Economics and Sustainable Development*, 4(14), 112-122.

Muyanga, M., and Jayne, T. (2014). Effects of rising rural population density on smallholder agriculture in Kenya. *Food Policy*, 48(1), 98-113.

Muyanga, M., and Jayne, T. S (2014). Is small still beautiful? The farm size-productivity relationship Revisited. In *Conference on Land Policy in Africa*.

Mureithi, S., and Opiyo, F. (2010). Resource use planning under climate change: Experience from Turkana and Pokot pastoralists of Northwestern Kenya. In *Proceedings at 2nd International Conference on Climate, Sustainability and Development in Semi-Arid Regions*, 16, p. 20

Mwagore, D. (2003). Land use in Kenya: The case for a national land use policy (Vol.3). Kenya Land Alliance.

Mwang'ombe, A., Nyariki, D. and Thompson, D. (2009). Land use change and livestock production challenges in an integrated system: The Maasai Mara ecosystem, Kenya. *Journal of Human Ecology* 26 (3), 163-173

Mwangi, E. (2007). The puzzle of group ranch subdivision in Kenya's Maasailand. *Development and Change*, 38(5), 889-910.

Niklas L., Mikael, S. (2005). Conflict, Conflict Prevention and Conflict Management and beyond. A conceptual exploration. Concept Paper, Central Asia- Caucasus Institute & Silk Road Studies Program, Washington, D.C.

- Nyberg, G., Knutsson, P., Ostwald, M., Öborn, I., Wredle, E., Otieno, D. and Grönvall, A. (2015). Enclosures in West Pokot, Kenya: Transforming land, livestock and livelihoods in drylands. *Pastoralism*, 5(1), 25-37.
- Obeng-Odoom, F. (2012). Land reforms in Africa: Theory, practice, and outcome. *Journal of Development and Agricultural Economics*, 1(2), 18-26.
- Odgaard, R. (2006). *Land Rights and Land Conflicts in Africa: The Tanzania Case: Country Policy Study*. DIIS.
- Oduro-Ofori, E., Aboagye, A., and Acquaye, N. (2014). Effects of education on the agricultural productivity of farmers in the offinso municipality. *International Journal of Development Research*, 4(9), 1951-1960.
- Omiti, J., Otieno, D., Nyanamba T., and McCullough, E. (2009). Factors influencing the intensity of market participation by smallholder farmers: A case study of rural and peri-urban areas of Kenya. *African Journal of Agricultural and Resource Economics*, 3(1), 57-82.
- Onoma, A. (2010). *The politics of property rights institutions in Africa*. Cambridge University Press. 2009
- Opiyo, F., Wasonga, O., Schilling, J., and Mureithi, S. (2012). Resource-based conflicts in drought-prone Northwestern Kenya: The drivers and mitigation mechanisms. *Wudpecker Journal of Agricultural Research*, 1(11), 442-453.
- Opiyo, F., Wasonga, O., and Nyangito, M. (2014). Measuring household vulnerability to climate induced stresses in pastoral rangelands of Kenya: Implications for resilience programming. *Pastoralism: Research, Policy and Practice*, 4(1)10-17
- Opoku, P. (2015). Economic Impacts of land-use Conflicts on Livelihoods. A case study of Pastoralists-farmer Conflicts in the Agogo Traditional Area of Ghana. *Journal of Energy and Natural Resource Management*, 2(1), 1-7.

- Osmani, A., and Hossain, E. (2015). Market participation decision of smallholder farmers and its determinants in Bangladesh. *Economics of Agriculture*, 62(297), 163-179.
- Otsuka, K., and Hayami, Y. (1988). Theories of share tenancy: A critical survey. *Economic Development and Cultural Change*, 37(1), 31-68.
- Rahman, S. (2010). Determinants of agricultural land rental market transactions in Bangladesh. *Land Use Policy*, 27(3), 957-964.
- Rahmato, D. (1984). *Agrarian Reform in Ethiopia*. Uppsala, Sweden: Scandinavian Institute of African Studies
- Randela, R., Alemu, Z., and Groenewald, J. (2008). Factors enhancing market participation by small-scale cotton farmers. *Agrekon*, 47(4), 451-469.
- Republic of Kenya. (2017a). Ministry of Lands and Physical Planning. Sessional Paper, No. 1 of 2017 on National Land Use Policy October, 2017.
- Republic of Kenya. (2017b). National Policy for the Sustainable Development of Arid and Semi-Arid Lands. ‘Unlocking Our Full Potential for the Realization of the Kenya Vision 2030.’
- Republic of Kenya. (2017c). National Food and Nutrition Security Policy, June 2017.
- Republic of Kenya. (2010). Laws of Kenya. The Land Titles Act. Chapter 282
- Rugege, D., Bob, U., Moodley, V., Mtshali, S., Mutanga, O., and Mthembu, A. (2007). A Literature Review for the Baseline Survey on Communal Land Rights Act in KwaZulu-Natal.
- Senadza, B. (2012). Non-farm income diversification in rural Ghana: Patterns and determinants. *African Development Review*, 24(3), 233-244.
- Sharp, J., and Smith, M. (2003). Social capital and farming at the rural–urban interface: the importance of non-farmer and farmer relations. *Agricultural systems*, 76(3), 913-927.

- Schilling, J., Opiyo, F., and Scheffran, J. (2012). Raiding pastoral livelihoods: motives and effects of violent conflict in north-western Kenya. *Pastoralism: Research, Policy and Practice*, 2(1), 25-40.
- Shiferaw, B., Hellin, H., Muricho, G. (2011). Improving market Access and Agricultural Productivity in Africa: What Role for Producer Organizations and Collective Action Institutions? *Food Security*, 3 (4), 475 – 489.
- Stifel, D. (2010). The rural non-farm economy, livelihood strategies and household welfare. *African Journal of Agricultural and Resource Economics*, 4(1), 82–109.
- Tangka, F., and Jabbar, M. (2005). Implications of feed scarcity for gender roles in ruminant livestock production. *Coping with feed scarcity in smallholder livestock systems in developing countries*, Conference Paper.287-296
- Teklu, T., and Lemi, A. (2004). Factors affecting entry and intensity in informal rental land markets in Southern Ethiopian highlands. *Agricultural Economics*, 30(2), 117-128.
- Tikabo, M., Holden, S., (2004). Factor market imperfections and the land rental market in the Highlands of Eritrea: Theory and Evidence.
- Vranken, L., and Swinnen, J. (2006). Land rental markets in transition: Theory and evidence from Hungary. *World Development*, 34(3), 481-500.
- Von Uexkull, N., and Pettersson, T. (2013). What they are fighting for: Conflict Issues in African non-state Armed Conflicts 1989-2011. In *54th Annual Meeting of the International Studies Association, San Francisco* (pp. 3-6).
- Wade, C. (2015). The Strategic Use of Private Property in a Rangelands Environment. The Political Ecology of Pastoralist Land Use Dynamics and Property Rights in Laikipia County, Kenya (Doctoral dissertation, MA Thesis, McGill University, Department of Geography).

- Wairore, J., Mureithi, S., Wasonga, O., and Nyberg, G. (2015). Characterization of enclosure management regimes and factors influencing their choice among agro-pastoralists in North-Western Kenya. *Pastoralism*, 5(1), 14-24.
- Wallace J. (2009) Making Land Markets Work for All, paper presented at the FIG and World Bank Conference on Land Governance in support of the MDGs: Responding to New Challenges, Washington DC, USA, 9-10 March 2009.
- Wandaka J., (2006) Opportunities and challenges to community participation in ecotourism management in Kimana Communal Ranch Kajiado District Kenya Master's Thesis, Kenyatta University
- Watson, D. (2008). Livelihood diversification opportunities for Pastoralists in Turkana. ILRI Research Report 5. Nairobi, Kenya.
- Wernersson, J. (2014). Towards a critical social theory of landscape: Perceptions and experiences of land-use change in Chepareria, Kenya.
- WISP (2010). Building climate change resilience for African livestock in sub-Saharan Africa World Initiative for Sustainable Pastoralism (WISP): a program of IUCN –The International Union for Conservation of Nature, Eastern and Southern Africa Regional Office, Nairobi, March 2010.
- World Bank (2011). *Rwanda Economic Update* (Spring Edition). World Bank: Kigali
- World Bank (2015). Uganda Economic update. Sixth Edition Searching for the “Grail”: Can Uganda’s Land Support its Prosperity Drive?
- Wooldridge, J. (2005). Introductory econometrics: A modern approach.
- Yamano, T., Place F., Nyangena W, Wanjiku J, and Otsuka K. (2008). Efficiency and Equity Impacts of Land Markets in Kenya. *The Emergence of Land Markets in Africa*, ed. S.T.

Yasmi, Y., and Schanz, H. (2007). Conflicts in natural resource management: toward conceptual clarity. *Institutionalization of Conflict Capability in the Management of Natural Resources*, PhD Thesis Wageningen University, Wageningen, the Netherlands.

APPENDICES

Appendix 1: Checklist Questions for Focus Group Discussions.

Theme: Understanding the Forms of Land Market Participation

SECTION A: Location Information

County.....District.....

Division.....Sub location.....

Location.....Village.....

SECTION B: General Information

1. Are people engaging in renting/ selling/ buying land? Why? How many (in per cent)?
2. What are the processes/ agreements/ institutions involved?
3. Which one is most common and why?
4. Is it possible to sell or buy land in the area?
5. What is the current value of land in the area?
6. How much does one pay to rent in and out land one considers to be of good quality?
7. Which is the most common ownership type of land in the area and why?
8. Who is responsible for land issues in the area?
9. Types of land conflicts in the area.
10. What is your opinion on the causes of land conflicts?
11. At what time/ period of the year are conflicts common?
12. Why are these conflicts so outstanding in this area?
13. Are there internal and external catalyst to the conflicts?
14. What are socio-economic effects of land conflicts?
15. Which group (farmers, pastoralists or agro-pastoralists) is most affected by land conflicts?
16. Possible strategies to stop land conflicts

Appendix 2: Household Survey Questionnaire

UNIVERSITY OF NAIROBI

**ANALYSIS OF DETERMINANTS OF AGRO-PASTORALISTS' PARTICIPATION IN EMERGING LAND MARKETS
AND ITS EFFECTS ON THEIR LIVELIHOODS IN WEST POKOT AND LAIKIPIA COUNTIES, KENYA**

AUGUST 2018

Purpose of the Survey

The University of Nairobi is conducting a study on the determinants of agro- pastoralists' participation in emerging land markets in West Pokot and Laikipia counties. Respondents of this survey should be agro- pastoralists of at least 18 years and above. Your participation is voluntary and you are also assured that the information you provide will be treated with confidentiality and used for sole purpose of research. Your support to the research is highly appreciated in advance. The interview will take at least one of your time. I request your permission to start now. For more information, contact Linet on 0726300402.

Appendix 1: Questionnaire

SECTION A: GENERAL INFORMATION

1) Name of enumerator _____ 2) Date _____
 3) Division.....4) Location _____
 5) Sub-location _____ 6) Village _____ 7) Farm household number ____
 Starting time _____ Ending time.....

SECTION B: FARM ENTERPRISES

8. What type of crops and livestock do you keep on your farm? Please fill the tables below;

i. Livestock

Livestock	Numbers	Number of years practiced	Main reason for venturing in livestock production 1=Cultural use 2=Ready markets 3=Expand source of income 4= Source of food 5= Drought tolerant 6=Disease resistant 7=Faster growth 5=Others(Specify)	What economic activities were you doing before you ventured into livestock production? 1=Formal employment 2=Charcoal Burner 3=Trader 4=Crop farmer 5= others(Specify)	How initial stock was acquired 1=Bought 2= Inherited 3=Received as bride price 4=Received as gift 5=Other (specify).....
Sheep					
Cattle					
Goats					
Poultry					
Bee keeping					
Donkeys					
Others(Specify)					

9) Please fill in the following table concerning livestock output sales in Kshs for the last 12 months.

Livestock product and their numbers	No of production months within the year	Average amount sold/month	Price per unit	Total value
Cow milk (Litres)				
Eggs(Trays)				
Goat milk(Litres)				
Honey(Kgs)				
Others (specify)				

10) Please tick the challenges you face in livestock production (List and rank them from *1=most serious 2= serious 3= least serious*)

Challenge	Rank
Livestock diseases	
High costs of drugs and vet services	
Rustling	
Livestock deaths caused by conflicts	
Expensive feed supplements	
Others(Specify)	

ii) CROP PRODUCTION

11) Do you grow crops besides being a pastoralist? *1=Yes, 0=No -----*

12) If Yes in 11 above, please fill the table below

Type of crop	Acres	Number of years Practiced	Reasons for crop production	Estimated yield in the last 12 months in units	Selling price per unit	Total value
		1=less than 2 years, 2=2-6 years, 3=more than six years	1=Exposure to crop farming 2= Minimize risk 3= Influence from neighborhood 4= Profitable 5=Others(specify)	1=90 kg bag 2=Debes 3=50 kg bag 4= Bunches 5 =other (specify)		
Maize						
Potatoes						
Beans						
Vegetables						
Bananas						
Sugarcane						
Others(Specify)						

13) Please indicate the problems you face in various stages of crop production if any (List and rank them from *1=most serious 2= serious 3= least serious*)

Crop grown	Activities involved	Challenges involved(Fill against each crop)	Rank
	1=Clearing of land 2=ploughing, 3=harrowing, 4=planting, 5=weeding, 6=spraying, 7=pruning, 8=harvesting, 9= threshing, 10= shelling 11= Storage 12= transportation (from farm and to market)13= others (specify)	1=High cost of seeds 2= Expensive hired labor 3= Labor shortage 4= Diseases 5= High cost of fertilizers and herbicides 6= Invasion by wildlife/livestock 7= Poor market prices	
1=Maize			

2=Potatoes			
3= Beans			
4=Vegetables			
5=Sugarcane			
6=Bananas			
7=Others(Specify)			

SECTION C: LAND MARKETS

14) Do you own/access land? *1=Yes 0=No*

15) If yes, fill the table below

Form of ownership	Total land under your control (Acres)	Total land in use under (Acres)	In case of farm size increase, what is the appropriate measure
1=Communal		Food crops	<i>1=clearing virgin land, 2=turning grazing land into cultivation. 3=Renting or borrowing, 4= buying land, 5= do not know. 6=Others(Specify)</i>
2=Ownership with title deed		Livestock production	
3=Ownership without title deed		Pasture Production	
4=Rented		Charcoal burning	
5=Inherited		Housing	
6=Leasing		No use	
7=Others (Specify)			

16) Are you aware of the emerging land markets in the area? **(1)Yes (0) No** If yes, fill the table below

Emerging market for	Most common in	Source of land information	Channels of information
1=Renting in/out land	1= <i>Ywalateke</i>	1=County land officer	1= Group meetings
2= Selling land	2= <i>Kipkomo</i>	2=Government extension agent	2=Neighbors
3= Buying land	3= <i>Shalpogh</i>	3=Newspapers	3=Chief Barazas
4=Leasing in/out land	4= <i>Others(Specify)</i>	4= Posters	4= Media(specify)
	<i>Laikipia</i>	5 =Others (Specify)	5= Others (specify)
	1= <i>Rumuruti town</i>		
	2= <i>Kabati</i>		
	3= <i>Kirima</i>		
	4= <i>Others (specify)</i>		

17) If in the last decade, you participated in any of the above markets, kindly fill the tables below;
 b) Have you rented in / rented out land? (1) Yes (0) No

Reasons for renting land	Estimated incomes from renting out land	Rate of renting in/out land? Ksh/acre/year	Timeline for renting in/out of land	What are renting in/out payment arrangements	Contracts involved between tenant and landlord	Land use decision	Benefits from renting in/out land	Main Challenges involved
<p>Lessee 1=Limited access to grazing lands 2=Expand source of income 3=Declining farming land 4=Decreasing farm quality 5=Others (specify)</p> <p>Lessor 1=Demand for land for grazing 2=Expand source of income 3=Labour shortage 4=Personal problems(illnesses, school fees) 5=Off farm job 6= Others (Specify)</p>	<p>1=<5000, 2=5001-10,000, 3=10001-15000, 4=15001-20,000, 5=20001-25000, 6=25001-50000 7=>50,000</p>		<p>1= Less than a year 2= More than a year</p>	<p>1= Cash payment 2=Crop share 3=Fixed Bushel rent 4=Livestock 5=Others(specify)</p>	<p>1= Formal with witnesses 2= Informal agreements</p>	<p>1=Land owner 2= Tenant 3= Village elders 4=County Government 5=Others(Specify)</p>	<p>1= increased income source 2= improved crop yields 3= Livestock yields 4= Increased herdsizes</p>	<p>1=Default and Breach of Agreement 2= Customs and culture involved 3= Conflicts 4= Others(Specify)</p>

18) In the last decade have you Bought/Sold any land? *1=Yes; 0=No*

Reasons for buying/selling land	Do you have any institutional right/certificate to land ownership?	What institutional right (s) do you have over your land holding?	In case of land sale, who makes the decision?	Transaction process between buyer and seller	Main sellers/buyers of land in the area	Main Challenges involved	Benefits accrued after buying/Selling land
1=Increased livestock size 2=Expand source of income 3=Expand land for cultivation 4=Expand land for pasture production 5=Form of investment 6=Others(specify) Selling 1=Poor land productivity 2= Family emergence 3= Purchase food during famine 4=Declining herd sizes 5=Others(Specify)	1= Yes 0=No	1= Title deed 2=Customary Right 3=Village protection 4= Others (Specify)	1=Household head 2= Village elders 3=Family members 4=Others(Specify)	1= Formal conveyance 2= Informal agreements with witnesses 3=Other (Specify)	1= Local people 2= Other people from outside the area 3=Others, specify	1=Default and Breach of Agreement 2= Customs and culture involved 3= Conflicts 4=Others(Specify)	1= Acquired land 2=Increased farm yields 3=Improved income 4=Expanded land for cultivation or pasture 5= Others(specify)

(b) Land transactions

Changes in land transactions in the last 3 decades	1988-1992	1992-1997	1997-2002	2002-2007	2007-2012	2012-2017
Role of the following in land transactions	<p>Customary institutions</p> <p>1= land adjudication</p> <p>2=Land allocation</p> <p>3=land management</p> <p>4=Others(Specify)</p>	<p>Village elders</p> <p>1=Land administration</p> <p>2= Land sale negotiations</p> <p>3=Others(Specify)</p>	<p>County government</p> <p>1=Land survey and mapping</p> <p>2=Land registration</p> <p>3=Marking of boundaries</p> <p>4=Others(Specify)</p>	<p>Management groups (Farmer/ Grazing)</p> <p>1=</p> <p>2=</p> <p>3=</p>		
Public participation process in land transactions if any;	<p>Who are the participants</p> <p>1=Pastoralists</p> <p>2= Crop farmers</p> <p>3=Village land committee</p> <p>4= County land officials</p> <p>5=Others(Specify)</p>	Processes involved	When does it take place	<p>Strengths</p> <p>1=</p> <p>2=</p> <p>3=</p>	<p>Weaknesses</p> <p>1=</p> <p>2=</p> <p>3=</p>	

19) Have you experienced changes in land markets, land demand patterns as well as land use for the last decade? 1=**Yes** 2=**No** If yes, kindly fill the tables below

Drivers of emerging changes in land markets <i>1= Changing land uses</i> <i>2=Growing population</i> <i>3=Changing tenure systems</i> <i>4= Land related conflict(Specify)</i> <i>5= Others(Specify)</i>	Effects of land markets changes on;	
	Culture	
	Environment	
	Food security	
	Nutrition	
	Health and safety	
	Social security	
	Economic well being	

b) Land demand patterns

Kindly rank the demand for land in the last decade <i>1= Increased demand</i> <i>2= Decreased demand</i> <i>3=No change</i> <i>4=Others(Specify)</i>	Causes of land demand(increase of decrease) <i>1= Presence of tarmac road</i> <i>2= Mineral discoveries</i> <i>3= Accessibility to watering points</i> <i>4= Strict regulations on land uses</i> <i>5=Upcoming town centers</i> <i>6= Nearness to social amenities</i> <i>7= Others(Specify)</i>
---	--

c) Land use changes

Initial land use	Current use	Causes of change	Effect of new governance on land use	Effect of change on livelihoods
1= Pastoralism 2=Traditional agriculture 3= Hunting 4=Fallow land 5=Grassland 6=Others(Specify)	1= Intensive crop production 2=Mixed farming 3= Residential uses 4= Infrastructural development(List them) 5=Sedentiarisation 6= Mining 7=others (Specify)	1= Growing population 2= Individualization of tenure 3= Poor land use planning 4=Land use regulations by county government 5=Poor cultural Practices(Specify) 6=Land related conflicts 7= Mineral discoveries(List them) 8=Land act policies 9=Others(Specify)	1= Increased/decreased land valuation 2=Reduced land investments 3=Limited livelihood options 4=Increased/ decreased land demand 5=Others(Specify)	1= Water and pasture deprivation 2= Individual dispossession of land 3= Frontiers of land conflicts 4= Change of livelihood 5=Land degradation 6=Improved food security 7=Others(Specify)

20) In your opinion, what do you think needs to be improved concerning land?

.....

SECTION D: LAND-RELATED CONFLICTS

21) Have you personally been involved in land-related conflicts in the last 10 years? (1) Yes (0) No

22) If Yes (in above), please fill the table below

Conflicts against whom	Forms of conflict involved in	Type of tenure where you experienced conflicts the most	Major causes of land conflicts	Time of the year you experienced the conflicts	No of times you experienced the form(s) of conflict chosen	Major effects caused by land conflicts
1) Pastoralists (2) Farmers (3) Investors (4) Family members 5) Wildlife (6) Others (specify)	1= Animals trespassing 2=Land boundary fights 3=Internal family disputes 4=Frauds in land selling process 5=Grazing space fights 6=Others(Specify)	1= Private with title deed 2= Private without title deed 3=Communal	1)Scarcity of pastures (2) Declining land sizes (3)Water scarcity (4) Poor land administration (5) Village boundaries (6) Others (specify)	1) Dry season (2) Rainy season (3) All year round	1=once 2=more than 2 times 3= more than 5 times	1 Loss of livestock through rustling 2 Loss of livestock due to death 3 Loss of household assets 4 Loss of cash income 5 Loss of crops 6 Quality deterioration of livestock 7 Loss of human lives 8 Others(Specify)

23) Has there been efforts to resolve the conflicts? 1=Yes 2=No

24) If yes, please fill the table below

In cases of conflicts, has there been efforts to mediate?	Who has led the efforts to mediate when the conflict arises?	Are these conflicts manageable at the village level?	Which general solutions do you think could be workable and of long term to these conflicts?	Apart from land conflicts, what are the other types of conflicts existing	What are their causes?
(1) Yes (2) No	(1) National government (2) Religion institutions (3) NGOs (specify) (4) Community	(1) <i>Yes</i> (0) <i>No</i>	1=putting up clear boundaries for demarcation 2=strengthening land board and land committees elected to	1=Politically instigated conflicts 2= Livestock raiding 3=Historical Rivalry 4=Others (specify)	(1) <i>Poverty</i> (2) <i>Non alternative livelihood</i> (3) <i>Prolonged drought</i> (4) <i>Others (specify)</i>

	/village elders (5) County Government Others (specify)		handle such issues 3=Community sensitization on land related issues 4=community dialogues 5=Others		
--	---	--	---	--	--

25) Do you think external forces are helping in maintaining peace in your village? (1) *Yes* (0) *No*

26) If yes (above), how?

.....

SECTION E: CREDIT ACCESS AND GROUP MEMBERSHIP

27) Did the household feel that there was a need for credit? 1=*Yes* 0=*No* -----

28) Did the household try to access credit last year? 1=*Yes* 0=*No*

29) If yes in above, fill out the table below.

Credit source	Purpose for credit 1= Renting in land 2= Crop production 3=Livestock production 4= Pasture production 5= Others (Specify)	Granted 1=Yes 0= No	Credit type 1= cash 0= In-kind	Amount requested	Amount Given	Proportion of loan already paid 1= 25%, 2=50% 3=75%, 4=100%)	Reasons if not granted 1=Lack of security 2=had another loan 3=defaulted previously 4=lack of enough savings 5=other (specify)
1=Microfinance institutions,							
2=commercial banks,							
3=cooperative societies,							
4=Local money lenders							
5=Others(Specify)							

30) If the household doesn't have access to credit, what is the reason why you cannot access credit facilities?

1= Lack of enough collateral 2=High interests rates 3=Too procedural 4= No need 5=Not aware. 6. Other (Specify)

31) Is the household a member of a group? *1=Yes 0=No*

32) If yes which one (s)? *1= Self-help Group 2=KFA 3= Cooperative society 4= insurance group 5= others (specify)*

33) What benefits do you get from the group? *1= Training 2= Loans 3=Market information 4= joint extension services 5= hedging against risk 6= others (specify)*

34) Do you have any other source of income apart from farming income? 1=Yes 0=No ----

35) If **Yes in 34** Please fill in the table below concerning other sources of income for the household.

Source of income	Average monthly income: 1=<5000, 2=5001-10,000, 3=10001-15000, 4=15001-20,000, 5=20001-25000, 6=25001-50000 7=>50,000	No of months the income was earned.	Total amount 1=<5000, 2=5001-10,000, 3=10001-15000, 4=15001-20,000, 5=20001-25000, 6=25001-50000 7=>50,000
Land rented out			
Hired out oxen and donkeys			
Employment income			
Income from buildings rented out			
Brick making			
Remittances			
Others(Specify)			

b) Percentage of income from all enterprises

Enterprises	% income earned in the last 12 months
Crop production	
Livestock Production	
Off farm employment	

Land transactions	
Business	
Others(Specify)	

SECTION F: HOUSEHOLD EXPENDITURE

36) On average how much did you spend on the following items last 12 months?

Food consumption -----School fees-----Clothing -----

House rent----- Funerals----- Medical care----- Dowry-----Crop

Production.....livestock production.....Others (Specify)

37) Is your farm income higher, same, less this year as compared to last year? Tick where appropriate

Farm income: Higher [] same [] Less []

38) Give reasons for the status-----

SECTION G: HOUSEHOLD ASSEST OWNERSHIP

	Assets name	Number owned	Current value	Mode of ownership 1= Bought 2=Received as a gift	If bought, state the year of purchase
1	Motorcycle, cars, bicycles				
2	Water tank, borehole				
3	Livestock owned				
4	Farm implements(pangas, hoes etc)				
5	Knapsack sprayer				

6	Television sets				
7	Radios				
8	Wheel barrows and carts				
9	Mobile phones				
10	Tractors				
11	Ox plough				
12	Residential houses(specify the location)				

SECTION H; HOUSEHOLD CHARACTERISTICS

1	Name of the Household head(HH)	
2	Name of respondent if not HH head	
3	Gender of the farm household head <i>1 = Male 2 = Female</i>	
4	Age of farmer(Years)	
5	Marital Status <i>1=Single, 2=Married, 3=widow(er), 4=divorced, 5= separated 6=polygamous 7=others (specify</i>	
6	Education Level of household head(Years) <i>0= no formal education. 1 = primary. 2= completed primary. 3= secondary. 4= completed secondary. 5= tertiary college or university</i>	
7	Main occupation of Farmer <i>1= Farming. 2= Trader. 3= Civil servant 4=livestock keeping 5=mixed farming 6=others (specify)</i>	
8	Average household size	

THANK YOU FOR YOUR TIME

