

**LAND USE CONFLICTS BETWEEN LOCAL COMMUNITIES AND
MANAGEMENT OF MKUNGUNERO GAME RESERVE, SIMANJIRO
TANZANIA**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
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ABSTRACT

Land conflicts between local community and a protected area is a common phenomenon in most African countries due to eviction of local communities to provide room for wildlife conservation. Land conflicts are emerging because of the failure to resolve existing conflicts in different areas between stakeholders. Long term conflicts have negative impacts economically, socially and ecologically. The aim of the study was to provide a better understanding of land use conflict between local community and management of Mkungunero game reserve with its associated costs and impacts. Purposive sampling was employed to select 2 villages. Simple random sampling technique was employed in selecting 120 households. Quantitative techniques, Regression analysis and content analysis were used for data analysis. The variables which were found statistically significant at 5% level include number of livestock, distance to game reserve, household size, settlement area, grazing area and agricultural area. Majority (82%) of respondents reported that their life has been negatively impacted by the land use conflict. The impacts were destruction of properties like houses, utensils, bicycles, crops, and livestock but there is no significant difference in income per month between affected and non-affected respondents. Other impacts were physical injuries, decline in education, abandonment of farms and jobs. Moreover, Mkungunero game reserve encountered increase in management cost and destruction of habitat. Different conflict resolution strategies have been practiced but they were not effective. The interests of majority of local community were protection of their livelihood while interest of Game reserve management was conservation. In view of research findings, it is suggested that local community should be educated on importance of conservation and supported in creating diverse income generating activities to reduce dependence on livestock.

DECLARATION

I, Sarafina Isdori, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work done within the period of registration and that has neither been submitted nor concurrently being submitted in any other institution.

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TABLE OF CONTENTS

ABSTRACT	ii
DECLARATION	iii
COPYRIGHT	iv
ACKNOWLEDGEMENTS	v
DEDICATION	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	xiii
LIST OF FIGURES	xv
LIST OF APPENDICES	xvi
LIST OF ABBREVIATION AND ACRONYMS	xvii
CHAPTER ONE	1
1.0 INTRODUCTION	1
1.1 Background Information	1
1.2 Problem statement and justification of the study	3
1.2.1 Problem statement	3
1.2.2 Justification of the study	5
1.3 Objectives of the study	5
1.3.1 Overall objective	5
1.3.2 Specific objectives	5
1.4 Research questions	6
CHAPTER TWO	7
2.0 LITERATURE REVIEW	7
2.1 Overview of land conflicts in protected areas	7
2.2 Livelihoods and protected areas	7

2.3 Drivers of land use conflict	8
2.3.1 Poverty	8
2.3.2 Climate changes	8
2.3.3 Demographic changes.....	9
2.3.4 Economic influence	9
2.3.5 Governance of land resources.....	10
2.3.6 Competition over increasingly scarce resources.....	10
2.3.7 Awareness on laws on environmental conservation.....	11
2.4 Impacts and costs of land conflicts on the livelihoods of local community and protected areas	11
2.4.1 Impacts of conflicts on education and health services.....	12
2.4.2 Death and injuries	12
2.4.3 Time lost in managing conflicts.....	13
2.4.4 Impacts of land use conflict on crops, food security and income.....	13
2.4.5 Impacts of land use conflict on livestock and destruction of properties.....	14
2.4.6 Impacts of land use conflict on wildlife and tourism.....	14
2.5 Conflict resolution strategies.....	15
2.5.1 Approaches of conflict resolution.....	15
2.5.2 Types of conflicts resolution practiced in protected areas.....	16
2.6 Positions and interests of stakeholders in regards to conflict in PAs.....	18
CHAPTER THREE	20
3.0 RESEARCH METHODOLOGY.....	20
3.1 Description of the study area.....	20
3.1.1 Location and size	20
3.1.2 Climatic condition.....	21
3.2.3 Population and ethnicity	22

3.1.4 Socio-economic activities	22
3.2 Research design	22
3.3 Sampling procedure and sample size determination	22
3.4 Questionnaire pilot testing	23
3.5 DATA COLLECTION METHODS	23
3.5.1 Primary data	23
3.5.1.1 Questionnaire survey	23
3.5.1.2 Focus group discussions	23
3.5.1.3 Key informants interviews	24
3.6 Data analysis	24
3.6.1 Drivers of land use conflict between local communities and management of Mkungunero game reserve	24
3.6.1.1 Variable description used in the model.....	24
3.6.1.1.1 Education level of household head	25
3.6.1.1.2 Household size	25
3.6.1.1.3 Grazing area	25
3.6.1.1.4 Agriculture area	26
3.6.1.1.5 Distance to the game reserve	26
3.6.1.1.6 Settlement area.....	27
3.6.1.1.7 Number of livestock.....	27
3.6.1.1.8 Fuel wood	27
3.6.2 Impacts and costs of the land use conflict on assets and income of local community surrounding game reserve.....	28
3.6.3 Conflict resolution strategies, stakeholders' interest and positions over prevailing land conflict	28

CHAPTER FOUR.....	29
4.0 RESULTS AND DISCUSSION.....	29
4.1 Socio-economic characteristics of respondents in the study area	29
4.1.1 Sex of the respondent.....	29
4.1.2 Age of respondent.....	29
4.1.3 Marital status of respondents	29
4.1.4 Household size	31
4.1.5 Educational level of respondents	31
4.1.6 Economic activity of respondents.....	31
4.2 Drivers of land use conflict between local communities and management of Mkungunero game reserve.....	32
4.2.1 Drivers of land use conflict between local communities and management of Mkungunero game reserve	32
4.2.1.1 Household size.....	33
4.2.1.2 Distance to game reserve	34
4.2.1.3 Number of livestock.....	34
4.2.1.4 Grazing area	35
4.2.1.5 Area for crop production.....	35
4.2.1.6 Settlement area.....	36
4.3 Detecting multicollinearity.....	36
4.4 Costs and impacts of land use conflicts on Mkungunero game reserve and on the assets and income of local communities around game reserve.....	37
4.4.1 Crops destroyed during the conflict in Kimotorok village between 2008 and 2015.....	39
4.4.2 Livestock destroyed during conflict in Kimotorok between 2008 and 2015.....	40

4.4.4 Time lost by local community in land use conflict resolution in Kimotorok village.....	44
4.4.5 Impacts of land use conflict on income of local community in Kimotorok and Loiborsiret.....	45
4.4.5.1 T-test for comparison of income per month between Loiborsiret and Kimotorok	45
4.4.5.2 T-test for comparison of income obtained from crops in 2014/2015 between Loiborsiret and Kimotorok.....	45
4.4.5.3 T-test for comparison of value of crops consumed in 2014/2015 between Loiborsiret and Kimotorok.....	46
4.4.5.4 T-test for comparison of income from livestock in 2014/2015 between Loiborsiret and Kimotorok.....	47
4.4.5.5 T-test for comparison of value of consumed livestock in 2014/2015 between Loiborsiret and Kimotorok.....	47
4.4.6 The impacts of land use conflict on Mkungunero game reserve	48
4.4.6.1 Impacts of land use conflict on wildlife.....	48
4.4.6.2 Impacts of land use conflict on tourism.....	48
4.4.6.3 Impacts of land use conflict to workers and resources	49
4.5 Land use Conflict resolution strategies in Kimotorok village.....	49
4.5.1 Effectiveness of conflict resolution strategies	50
4.5.2 Involvement of stakeholders in land use conflict resolution	51
4.5.3 Condition of conflict in the study area.....	52
4.6 Positions and interests of stakeholders in regards to the land use conflict in the study area	53
4.6.1 Positions of local community in regards to the land conflict	53
4.6.2 Position of Mkungunero game reserve management.....	54

4.6.3 Interests of stakeholders in regards to the land use conflict	55
4.6.3.1 Interests of local community in Kimotorok regarding the land use conflict	55
4.6.3.2 Interests of Mkungunero game reserve management	55
CHAPTER FIVE.....	57
5.0 CONCLUSIONS AND RECOMMENDATIONS	57
5.1 Conclusions	57
5.2 Recommendations	59
REFERENCES	61
APPENDICES	70

LIST OF TABLES

Table 1: Respondents socio-economic characteristics in Kimotorok and Loiborsiret	30
Table 2: Model summary for drivers of land use conflict in the study area.....	32
Table 3: Multiple regression results for drivers of land use conflict between local community in Kimotorok village and management of Mkungunero game reserve.....	33
Table 4: Impacts of land use conflict to local community in Kimotorok.....	38
Table 5: Crops destroyed during conflict in Kimotorok between 2008 and 2015	39
Table 6: Crops destroyed during the conflict in Kimotorok village between 2008 and 2015	39
Table 7: Number of livestock destroyed during conflict and their approximate value in Kimotorok between 2008 and 2015	41
Table 8: Destroyed properties during conflict and their approximate value in Kimotorok between 2008 and 2015	43
Table 9: Time lost in conflict resolution by local community in Kimotorok village.....	44
Table 10: Means comparison results for income per month between Loiborsiret and Kimotorok	45
Table 11: Means comparison results of income obtained from crops in 2014/2015 between Loiborsiret and Kimotorok	46
Table 12: Means comparison results of value of consumed crops 2014/2015 between Loiborsiret and Kimotorok.....	46
Table 13: Means comparison results of income obtained from livestock 2014/2015 between Loiborsiret and Kimotorok	47

Table 14: Means comparison results of value of consumed livestock in 2014/2015 between Loiborsiret and Kimotorok	48
Table 15: Efforts in resolving conflict	50
Table 16: Effectiveness of conflict resolution strategies between Kimotorok and Mkungunero game reserve	51
Table 17: Condition of conflict between Kimotorok and Mkungunero game reserve.....	53
Table 18: Positions of local community in Kimotorok regarding land use conflict with Mkungunero game reserve.....	54
Table 19: Interests of local community in Kimotorok regarding land use conflict	55

LIST OF FIGURES

Figure 1: Map showing the study area	21
Figure 2: Percentage of local community in Kimotorok village affected by land use conflict	37
Figure 3: Livestock destroyed in Kimotorok during conflict.....	41
Figure 4: Destruction of properties in Kimotorok.....	42
Figure 5: Involvement of stakeholders in conflict resolution between Kimotorok and Mkungunero game reserve	52

LIST OF APPENDICES

Appendix 1: A questionnaire administered to households in the study area70

Appendix 2: Checklist for focus group discussion.....75

Appendix 3: Checklist for village government officer.....76

Appendix 4: Checklist for Simanjiro district land officer77

Appendix 5: Checklist for Mkungunero game reserve officers78

LIST OF ABBREVIATION AND ACRONYMS

Df	Degrees of freedom
FGDs	Focus Group Discussions
KIIs	Key Informant Interviews
MGR	Mkungunero Game Reserve
N	Naira
NBS	National Bureau of Statistics
NCA	Ngorongoro Conservation Area
NCAA	Ngorongoro Conservation Area Authority
NGOs	Non-Governmental Organisations
PAs	Protected Areas
SNAL	Sokoine National Agricultural Library
SPSS	Statistical Package for Social Sciences
TZS	Tanzanian Shillings
VIF	Variance Inflation Factor
χ^2	Chi square

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Natural resources and ecosystems degradation are among critical environmental problem with negative consequences (Kariara, 2009). The effects are resulting from unsustainable use of these resources by local communities living adjacent to protected areas (PAs) (Kariara, 2009). African regions are rich in biodiversity and other natural resources present in different categories of protected areas, but these regions are facing challenges on environmental conservation and increasing pressure over these resources (UNIFTA, 2008).

Establishment of protected areas such as national parks and game reserves is a common means of protecting biodiversity from habitat loss and hunting pressures in many African countries. Protected areas enhance conservation by applying land use restrictions such as banning bush meat, hunting and the collection of fuel wood or timber. Moreover, these restrictions help to protect conversion of land into agriculture and other socio-economic activities (Norton-Griffiths and Southey, 1995). Unfortunately, legal enforcement of land uses imposes high costs to local communities leading to land conflict (Norton-Griffiths and Southey, 1995).

Land is increasingly becoming source of conflicts in Africa (Yamano, 2005). Land conflicts are emerging because of the failure to resolve existing conflicts in different areas between stakeholders who have different interests (Sackey, 2010 and Wehrmann, 2008). Long term conflicts have negative impacts economically, socially and ecologically (Hoffman, 2003). Ineffective ways of resolving land conflicts may lead to terrible effects

from individual level to national level (Sackey, 2010). There is increased competition to get access to arable land and pastures in Africa leading to land conflicts with other interrelated factors like increased competition between different land utilization patterns such as cultivation, pastoralism and conservation (Odgaard, 2006). The condition in most African countries at present is undermined and there are weak land disputes regulating systems (Odgaard, 2006).

Land conflicts are not new incidents in Tanzania even though the country has million hectares of arable land but it is still experiencing growing extent of conflict among resource users (Hakiardhi, 2009). Majority of populations living in the villages adjacent to PAs depend on agriculture for their livelihood putting land under pressure resulting into a number of conflicts between different land users due to invasion in PAs for agriculture expansion (Mango *et al.*, 2011). Mostly there are two causes of conflicts between PAs and local communities. Firstly, failure to involve local communities in the planning process, management and decision making for the area (Lewis, 1996). Secondly, the influences of people's need that are contradicting with the objectives of the PAs (Lewis, 1996). Protected area staff faces the challenge of resolving conflicts while maintaining human wellbeing and the natural environment (Lewis, 1996).

Wildlife act of 2009 section 14 (1) pointed out that the President may, after consultation with relevant local authorities, and by order, in the gazette declare any area of Tanzania to be a game reserve (URT, 2009). The establishment and gazzetiment of land for PAs such as national parks, game reserves go simultaneously with violation of villagers' rights on land resulting to land conflicts among the villagers and PAs (Hakiardhi, 2009).

The solution of the land conflict needs extra attention compared to other conflicts in the country. This is due to the fact that the security of the state may be at tension if these

conflicts increase (Hakiardhi, 2009). Besides as encroachment on protected areas increases, also more efforts are needed for effective management like exclusion of local communities within PAs. However, exclusionary management practices tend to create tensions between local people and the authorities (Plumptre *et al.*, 2004).

Wildlife conservation imposes opportunity cost of land and other resources (Lara, 2010). The costs and benefits of conservation are unequally shared between stakeholders causing conflicts or limiting the successful conflict resolution (Kideghesho, 2006). Mkungunero Game Reserve (MGR) is one of PA that has imposed costs of land and other resources to surrounding community leading to land use conflict. MGR was formerly a game controlled Area but in 1996 its status was upgraded to a game reserve, since the area is ecologically important for migration of animals between Tarangire national park and other protected areas. The management extended its boundaries to approximately 5,000 hectares, with minimum consultation of adjacent communities of in Kondoa and Simanjiro District (Sulle *et al.*, 2011). New boundaries displaced many residents of Ilkiushoibor and Kimotorok which has created a long standing land and boundary conflict between local community and wildlife division (Sulle *et al.*, 2011).

1.2 Problem statement and justification of the study

1.2.1 Problem statement

There are growing level of concerns about the protection of wildlife by expanding boundaries which cause conflict between protected areas and communities surrounding the game reserve. Different options for resolving land conflict between stakeholders are known but seem to be ineffective. The eviction of local communities in order to provide room for wildlife conservation has taken place in almost all rangelands of Tanzania,

justified by expansion of national parks and creation of game reserves example Mkomazi game reserve Kideghesho *et al.* (2013). The expansion of the national park boundaries has further been justified on the basis of redefining the national park borders that have been encroached by the local communities, example between 2004 and 2007 Tarangire national park borders were redefined which led to the demolishing of human habitats and farms. A similar scenario has been observed at the Arusha national park following an attempt to extend the forest patch adjacent to it. The eviction has overtime exacerbated the conflicts between these parks and surrounding local communities Kideghesho *et al.* (2013).

Research findings revealed that land use conflicts in protected areas have many impacts to local community including displacement where by people are forced to leave their land and are restricted to access resources Coad *et al.* (2008). CADMA, (2011) found that the impacts of land conflict were reduced food supplies, reduced business, loss of markets by local businesses, communities disintegration, closure of schools, loss of properties, and destruction of crops. Nana *et al.* (2014), asserts that local community lost their farms due to land grab by Mount Cameroon national park despite crop farming being most important source of livelihood for the local people. With the loss of part of their farmland, and a restriction on accessing forest resources inside the park, the future prospects of development for these local people are quite miserable. Also Emanuel *et al.* (2013) established impacts of land use conflict in Gorowa community as depression to people, death, injuries and depopulation.

Currently Mkungunero game reserve is facing a serious land and boundaries conflict with the neighboring villages in Simanjiro and Kondoa districts (Sulle *et al.*, 2011; PINGO, 2013). Land use conflict between local communities and wildlife division in Mkungunero game reserve has been a salient feature for years. There have been efforts to resolve these

conflicts however conflict have persisted and intensified. Failure in resolving these conflicts warrants further investigation. Therefore; this study intends to explore land use conflict between surrounding communities and Mkungunero game reserve by establishing drivers of land use conflict, costs and impacts of the conflict to local communities and Mkungunero game reserve, current conflict resolution strategies and interests as well as positions of different stakeholders.

1.2.2 Justification of the study

This study is expected to contribute significantly to the body of knowledge on the existing challenges regarding the land use conflict between the game reserve and village communities living adjacent to Mkungunero game reserve. The findings from this study are intended to furnish information that will assist policy makers, NGOs and other stakeholders in designing appropriate measure to reduce conflict in PAs. It is also expected to help planners to understand the economic impacts of conflicts to local communities and to protected areas.

1.3 Objectives of the study

1.3.1 Overall objective

The overall objective of this study was to investigate land use conflicts between local communities and management of Mkungunero game reserve and their economic impacts with the view to draw lessons for conflict reduction in the study area.

1.3.2 Specific objectives

The specific objectives of the study were to:

- (i) analyse drivers of land use conflict between local communities and management of Mkungunero game reserve.

- (ii) analyse costs and impacts of land use conflicts on management of game reserve and on assets and income of local communities around Mkungunero game reserve.
- (iii) assess current conflict resolution strategies undertaken in the study area.
- (iv) assess the interests and positions of different stakeholders in regards to the conflict in the study area.

1.4 Research questions

The study strove to answer the following questions

- (i) What are causes of land use conflicts between local communities and management of Mkungunero game reserve?
- (ii) What are costs and impacts of land conflict to assets and income of local communities?
- (iii) What are socio implications of land conflict to local communities?
- (iv) What are different options for conflict resolution in the study area?
- (v) What are the positions and interests of different stakeholders in regards to the conflict in the study area?

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview of land conflicts in protected areas

Natural resource conflicts occur due to multiple and competing demands on resources. Land use conflicts can arise if user groups are excluded from participating in natural resource management, if there are contradictions between local and introduced management systems, lack of information about policy and programme objectives, lack of clarity in laws and policies, inequity in resource distribution or poor policy and programme implementation (FAO, 2000). Examples of land use conflicts between protected areas and local community in Tanzania are conflict between pastoralist and conservation in Loliondo in 2009 (Maliasili initiatives, 2011), conflict between Ngorongoro conservation area authority (NCAA) and Maasai community (Lawuo *et al.*, 2014).

2.2 Livelihoods and protected areas

The impacts of protected areas on local poverty are negative and potentially positive (Adams *et al.*, 2007). Although the global benefits of biodiversity and ecosystem services are well recognized the costs of protected areas (PAs) may be disproportionately borne by local people (Adams *et al.*, 2007). Many PAs have failed to consider important factors in management such as social, cultural, and political issues. Often, communities are forbidden from extracting natural resources that are important for their livelihoods, and in many instances, traditional communities are removed from their lands with little consultation or adequate compensation (Anthony, 2007). Consequences of conservation policies on local communities are mainly attributable to reduction of traditional use and access rights, displacement of local communities, and lack of basic social services (Torri,

2011). Nana *et al.* (2014) established that people living adjacent to mount Cameroon national park have been exploiting resources for generations in order to survive but the transformation of the area into a national park dispossessed them with no compensatory measures put in place to support their livelihoods.

2.3 Drivers of land use conflict

2.3.1 Poverty

High levels of poverty and a lack of employment opportunities are the main causes of resource conflicts. People need incomes to support their basic needs turning them to PAs resources like timber, minerals, bush meat and honey for supporting their life although the markets lucrative are not profitable but can bring some incomes into households. The need for food also drives populations into the PAs resources as they depend on them for food (Crawford, 2012). Rangelands that were mainly devoted to pastoralism and wildlife conservation had sparse human population. However, the recent population saturation in fertile and high rainfall areas together with poverty has motivated in-migration to rangelands where people can access land for cultivation (Kideghesho *et al.*, 2013). Poverty at household level reduces ability of people to improve on existing livelihood strategies, thus forcing them to select for coping strategies that are unsustainable and ecologically destructive (Kideghesho *et al.*, 2013).

2.3.2 Climate changes

Climate change affects rainfall and temperature causing food insecurity which forces people to depend on natural resources. These changes on environment cause people to migrate to areas which are not affected by climate change like in PAs to search for pastures and agriculture area leading to land competition which triggers conflict (UNIFTPA, 2012; Friis *et al.*, 2010) Climate change is not a direct source of conflict, but

it exacerbates resource scarcity and existing vulnerabilities. Climate change is usually presented as a threat multiplier, overstressing societies' adaptive capacities, weakening the institutional capacity of states to resolve conflict through peaceful and democratic means (UNIFTPA, 2012).

2.3.3 Demographic changes

Changes in demography can be caused by natural increment in population growth and migration. The rapid rate of population growth and migration reduce land availability causing communities to move towards PAs triggering land use conflict. Population growth is linked to land use conflict by the additional land that is required for livelihood (Mosore, 2011, Siyum *et al.*, 2015; FAO, 2006). The rapid human population growth increases demand and competition for resources that has resulted in an increased exploitation of resources beyond the capacity. The demands are associated with wildlife and habitat destruction. These destructions are caused by establishment of human settlements, cultivation, livestock grazing, and competition for water points for livestock, domestic use and wildlife leading to land use conflict between local communities and PAs management (Kideghesho *et al.*, 2013).

2.3.4 Economic influence

Economic growth is associated with increase in demand for natural resources such as land. The source of income which depends much on land can lead to conflict because people will be competing over the resource to attain their livelihood (Campbell *et al.*, 2005; FAO, 2006). Economic and social factors create pressures on the ecosystems (Calado *et al.*, 2014). Kideghesho *et al.* (2013) found that there is competition for land between conservation and economic activities in Selous–Niassa wildlife corridor due to increase in human population and activities, which are incompatible with conservation interests. The

recent environmental threat in Selous–Niassa wildlife corridor is likely to come from the mining activities which will impose environmental effects that are likely to arise from this economic opportunity (Kideghesho *et al.*, 2013). Nyamasyo *et al.* (2014) established that increased demand for agricultural produce to satisfy markets has accelerated the rate of irrigated farming in Kimana wetland ecosystem leading to land use conflict.

2.3.5 Governance of land resources

Governance of land resources refers to the institutions, policies and processes that are established to regulate their management, ownership, allocation, use and protection. Resource rights and related laws determine who can use what resources, for how long, and under what condition if there is poor governance then land use conflict occurs (UNIFTPA, 2012 and Mosore, 2011). Generally, there are four types of grievances generated by poor resource and environmental governance. Firstly, unclear, overlapping or poor enforcement of resource rights and laws. Secondly, discriminatory policies, rights and laws that marginalize specific groups. Thirdly, unequal distribution of benefits and burdens from development projects. Fourthly, lack of public participation and transparency in decision making (UNIFTPA, 2012).

2.3.6 Competition over increasingly scarce resources

The concept of resource scarcity is the situation where the supply of renewable resources such as forests, rangelands and croplands is not sufficient to meet the local demand. Increased scarcity of natural resources needed to sustain livelihoods can increase competition between user groups or between economic sectors (UNIFTPA, 2012). Social responses to rising competition can include migration, technological innovation, cooperation and violent conflict (UNIFTPA, 2012).

Example of conflict which has occurred due competition over scarce resources in protected areas is land conflict between Maasai community and NCAA. The land use competition occurred from the fact that the same land and natural resources that are critical for the livelihoods of pastoralists are needed to support other competing uses such as conservation leading to land use conflict (Odhiambo, 2008). In Ngorongoro number of livestock is bigger compared to the area located to them because livestock are not allowed to graze within the crater and the forest of NCA that lead to increase and persistence of land conflict. Also huge number of wild herbivores in NCAA increases demand for natural resource causing land use conflict (Lawuo *et al.*, 2014). Furthermore, scarcity of the land for grazing, agriculture and watering animals cause Maasai pastoralists to shift to reserved and controlled area in order to get enough land, water and pasture for their livestock leading to persistence of the land use conflicts (Lawuo *et al.*, 2014).

2.3.7 Awareness on laws on environmental conservation

This is one among the sources of land conflict between local community and PAs example conflict between Maasai community and NCAA. Local communities are not aware of these laws leading to conflict between them and NCAA. The conflict persist because people are not aware of rules and regulation which forbids them to conduct some activities in the area (Lawuo *et al.*, 2014).

2.4 Impacts and costs of land conflicts on the livelihoods of local community and protected areas

Land use conflicts have negative effects on individual households as well as on the nation's economy through increasing costs, slowing down investment, loss of properties for a conflicting parties and reduction in tax income. Land use conflicts are associated with high transaction costs. Conflicts over the use of land have a negative impact on

people and environment (Wehrman, 2008). Land conflicts affect different groups in different ways, not only do they have a stronger impact on the livelihoods of the poor but they also have different impacts on men and women, urban and rural populations, farmers and pastoralists (Wehrmann, 2008). Land conflicts increase poverty and livelihoods insecurity and it undermines opportunities for development and progress, resulting in poor indicators in key sectors of development (Odhiambo, 2008).

2.4.1 Impacts of conflicts on education and health services

Conflicts affect physical access to schools and other learning institutions. Students and teachers are unable to go to school due to insecurity resulting from conflicts. In most cases, schools get closed. Children are forced to drop out of school when families decide to migrate to other areas in search of physical security. Disruption of school leads to low levels of education, confining people to pastoralism as the only source of a livelihood (Omosa, 2005). Also conflict can lead to inability to pay children's school fees due to loss and reduction in income from crops during conflict situation. The inability to pay school fees would consistently decrease educational quality which is supposed to essentially assist in reducing poverty (Opoku, 2015). Conflicts interfere with people's access to health care services and facilities causing increase in diseases and poor health services (Opoku, 2015, Omosa, 2005).

2.4.2 Death and injuries

Conflict can lead to death and injuries, study conducted by Omosa (2005) found that 8% of respondents reported occurrence of death when fighting, while 18 % of the respondents had been injured. Death and injuries are a cost to households because they interfere with the flow and allocation of resources (Omosa, 2005). Oruenye (2012) found that conflict between local communities over land has caused loss of lives of 10 people, 15 persons

were injured in the conflict, while 4,764 persons were internally displaced by the conflict. Similarly Odhiambo (2008) reported death and injuries due to land use conflict in Ngorongoro District among different users.

2.4.3 Time lost in managing conflicts

Omosa (2005) conducted in Wajir district in Kenya and found that, conflicts consume time and resources during the period of conflict and also during conflict resolution. Results from the study done by Omosa (2005) showed that almost half 48 % of the respondents said it takes them up to one week, 10% up to two weeks, 23% up to four weeks to manage a conflict through negotiations. On the number of weeks taken to solve a conflict through fighting, 51% said it takes them up to one week, 16% up to one and half weeks 16 % up to two and half weeks, 6% up to four weeks, 1% up to six weeks and 1% up to 25 weeks to resolve conflicts. Analysis showed that it takes an average of five weeks to negotiate out of a conflict.

2.4.4 Impacts of land use conflict on crops, food security and income

Land use conflicts causes community to abandon their farms during conflict period due to insecurity, this discourage cultivation of crops imposing negative impact on food security in communities leading to food shortage and reduction of income generated from crop production (Opoku, 2015). There is a significant difference between the average farm income in the conflict communities and the non-conflict communities meaning that conflicts had direct effect on household incomes (Opoku, 2015). Land conflicts have a significant impact on the livelihoods of small hold farmers. Farmers who face such disputes are reluctant to apply long term land improvement measures and use of profitable perennial crops (CEEPA, 2011). Land conflicts between local communities results in destruction and burning of farms causing decrease of food quantity and increased poverty (Oruenye, 2012).

2.4.5 Impacts of land use conflict on livestock and destruction of properties

Oruenye (2012) found that conflict between local communities over land resulted in burnt down of houses in the process of attack and counter attack. Many people were rendered homeless, while others lost their source of livelihood. Results from study conducted by Oruenye (2012) in Tabara state found out that about 552 houses were burnt down. The destructions resulting from the conflict was estimated at about twenty two million, one hundred and forty thousand six hundred naira only N 22, 140,600. Omosa (2005) conducted in Wajir district in Kenya and found that, probabilities of losing livestock were very high during conflict and it was found that the number of lost livestock during conflict ranged from 2 to 230. Reduction in livestock, even by small number, is critical to people already living at the edge of poverty and malnutrition (Omosa, 2005).

2.4.6 Impacts of land use conflict on wildlife and tourism

Removing local communities from lands that they have been exploiting without consultation or adequate compensation can result in retaliation and hostile attitudes toward protected areas (Andrade *et al.*, 2012). Restricting local access to natural resources, which can play a crucial role in their livelihoods, might favor biodiversity conservation in the short term. However, in the long term, such strategies may fail to preserve biodiversity if PAs authorities disregard the importance of simultaneously promoting active local community participation in PA management (Andrade *et al.*, 2012). The short-term adverse impact of conflicts can range from a temporary reduction in the efficiency of resource management regimes, to the complete collapse of initiatives or abandonment of government, NGOs or donor-sponsored projects. In extreme cases conflicts over natural resources can escalate into physical violence (Warner, 2000). Also conflict can have impact on management in terms of increased time and costs of project operations (Warner, 2000).

The loss of biodiversity is the primary effect of land use conflicts. This includes the loss of endemic species as well as threats to habitat through soil degradation, erosion, fires and a reduction in pollination. Loss of biodiversity presents a threat to tourism, with consequent declines in tourism revenues and local employment opportunities (Crawford, 2012 and Segan, 2012). Study conducted by Cortina-Villar *et al.* (2012) found that human activities in protected areas of Sierra Madre de Chiapas caused a loss of forest cover of about 12% of the total area (0.6% per year) equivalent to 53,186 ha, from 1970 to 2000. The most affected types of vegetation were the old secondary semi-evergreen rainforest and the pine-oak forest, which lost 50 and 14% of their 1970 area, respectively.

2.5 Conflict resolution strategies

Conflicts can be resolved through different means such as use of force or through formal, legal or institutional means. Good conflict resolution process is one in which stakeholders have the opportunity to understand each other's needs, develop a range of alternatives to address those needs, and reach a mutually agreeable solution (Lewis, 1996). When conflicts directly affect the livelihoods of stakeholders, a solution can be to conserve biodiversity while encouraging individual stakeholders' economic growth (Young *et al.*, 2005). The components of conflict resolution are determining roles through getting the conflict resolution process started, assessment of the nature of the conflict by determining who is involved, obtaining information that is useful in designing effective conflict resolution process, involving affected stakeholders, implementation and evaluation of the agreed solutions (Lewis, 1996).

2.5.1 Approaches of conflict resolution

There are different strategies for resolving conflicts. Conflict can result in destructive effect or creative ones depending on the approach that is taken. If we can manage conflict

creatively, we can often find new solutions that are mutually satisfactory to both parties (Fisher, 2000). According to Fisher (2000) and Hughes *et al.* (2009) the approaches are; win-lose approach that what one party gains, the other loses. Lose-lose strategy where by neither of the party win each party gets some of what it wants, and resigns itself to partial satisfaction. The win-win approach which attempts to maximize the goals of both parties through collaborative problem solving.

Crawford (2012) found the following means from stakeholders in reducing conflict between PAs management and local community. (i) Increase community awareness of the park and the role of conservation. (ii) Targeting local authorities, PAs staffs, community members and stakeholders in management. (iii) Support small and medium sized community projects to increase the number of funded projects. (iv) Improvement of law enforcement, particularly through increased patrols, and reduce impunity for park related crimes. (v) Creation of incentives for efficient collaboration with the park such as study tours. (vi) Involvement of communities in park management and decision making. Maliasili initiative (2012) suggested the following land use conflict resolution strategies in Loliondo as the contested area to be either a village land or game controlled area or to establish a wildlife management area. Similarly, Western *et al.* (2015) pointed out that establishment of community based conservation can be a method to resolve conflicts between PAs and local communities.

2.5.2 Types of conflicts resolution practiced in protected areas

In Ngorongoro conservation area there were different resolutions strategies practiced to resolve land use conflict. First, government involvement in conflict resolution through NCAA whereby various means like meeting for agreement, provision of social services and weaken some conservation laws such as to allow the pastoralist to graze their

livestock within the crater and the northern highland forest during the dry season were employed. Although the government is involved but it did not successfully resolved the conflict (Lawuo *et al.*, 2014). Second, stakeholders' involvement in land conflict resolution where by different stakeholders were involved in conflicts resolution between NCAA and local community for example Ereto-Ngorongoro pastoralist project was the bilateral project between Denmark and Tanzania government. The project provided various services to Maasai community like animal medicines, education to pastoralist on better method of livestock keeping and construction of animal deep. This project reduced land conflict though conflicts still persist (Lawuo *et al.*, 2014 and Odhiambo, 2008).

Third, resettlement strategies done by NCAA in collaboration with other stakeholders by reducing number of people and livestock. These was planned to be done however it was found that few households showed their willingness to shift to other areas (Lawuo *et al.*, 2014). Fourth, restocking where by the government of Tanzania through the NCAA with other stakeholders has restocked the poor Maasai families by providing them with livestock including cattle and goats. The Ereto project restocked over 3400 poor families in the whole NCA. These have helped to reduce land conflicts as well as to improve the livelihood of the community. Furthermore this project supported some private veterinary services that provided pastoralists with modern and accessible options for treating livestock diseases (Lawuo *et al.*, 2014).

Study conducted by Fiagbomeh (2015) in Kakum conservation area in Ghana found out that provision of alternative sources of livelihood to compensate for reserving part of the land for conservation purposes in the area was important to ensure the sustainability of the protected area and it reduces negative attitude towards conservation resulted to reduction of land use conflict. Elsewhere, Nana *et al.* (2014) found out that through participatory

approach, embraced by management of the Mount Cameroon national park, the park authorities have reported increased collaboration of local communities and reduction in poaching activities.

2.6 Positions and interests of stakeholders in regards to conflict in PAs

Study conducted by Bragagnolo *et al.* (2016) in the Azores archipelago established two main positions towards the park by stakeholders which are negative and positive. The positions of local authority and local economy pertaining to the park were, park size reshaping, restrictions on the local economy and need for more flexible measures for ecotourism development as the park constraints the development of ecotourism and related infrastructures. Economic and social actors as well as park authority had more positive attitude indicating that the park should be primarily a way of protecting natural resources and there is a need to manage well human conservation conflicts. Park authority stressed the need to ban the enlargement of grazing areas for protecting biodiversity.

Study by Jesse *et al.* (2005) on management of watershed basin in Havel found that there are different opinions in the fields of agriculture and forestry regarding the management of the area. The forest management is more interested in seasonally balanced water tables, whereas the farmers prefer stronger regulation, adapted to the seasonal requirements of their agricultural uses. A study conducted by Kustanti *et al.* (2014) in Indonesia on actor, interest and conflict in sustainable mangrove forest management found different stakeholders interest. Forestry and fishery department were interested in science and technology implementation, community service, social economic improvement and economic sustainability. Village government interests were maintaining forest from conversion to other function and protection of community living. Fisherman group interests were to obtain benefits from fish around mangrove forest, fuel woods collection

from dry mangrove and sustainable yields. Farmer group interests were obtaining benefits, fuel woods collection from dry mangrove and sustainable yields. NGOs interests were community empowerment and obtaining benefits.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Description of the study area

3.1.1 Location and size

Mkungunero game reserve was established in 1996. The game reserve is in Dodoma region particular Kondoa district. It borders the eastern and southern boundaries of Tarangire national park. The size of the game reserve is approximately 743 km² (URT, 2009). The study area is situated on a tree savannah in arid country dominated by *Accacia* and *Commiphora* species (Ludwig, 2001 cited by Kshatriya *et al.*, 2006). Habitat is a combination of open grassland/swamp, open acacia microphyll, woodland and dense thickets (Ludwig, 2001 cited by Kshatriya *et al.*, 2006). The villages in which study was conducted were in Simanjiro district because the boundaries of reserve borders with Simanjiro district. Simanjiro is one of the 5 districts of the Manyara Region. It is bordered to the north by Arusha Region, to the north east by Kilimanjaro Region, to the south east by Tanga Region, to the south by Kiteto District, to the south west by Dodoma region and to the west by Babati District. Simanjiro district where study was conducted covers the area of 19928.1 km² (URT, 2012). The map of study area is shown in Fig. 1.

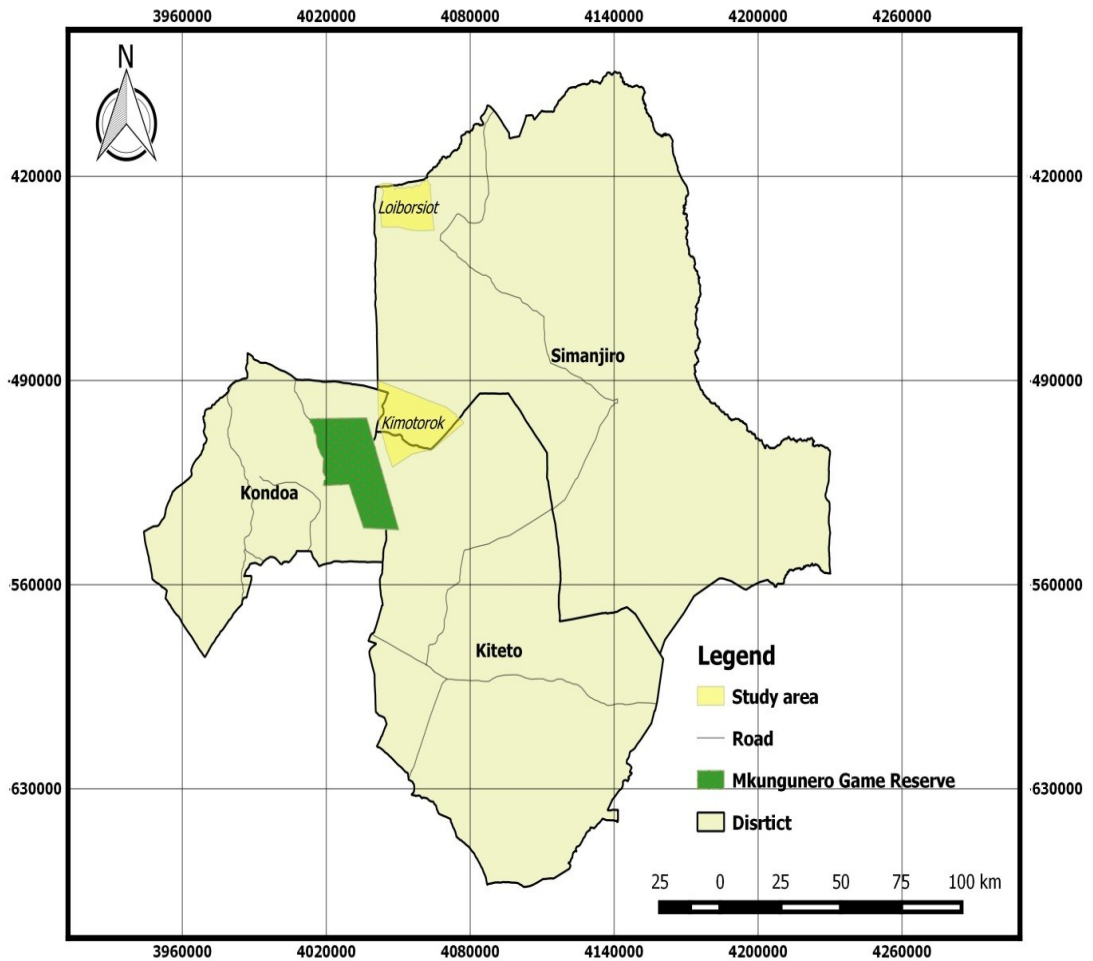


Figure 1: Map showing the study area

3.1.2 Climatic condition

The rainfall in the study area is bi-modal with short rains occurring between November and December followed by a dry spell and a longer period of rain from March to May. The short rains are very unreliable and show a high spatial variation. Rain averages to about 650 mm per annum, but can vary widely from year to year (TANAPA, 2001 cited by Kshatriya *et al.*, 2006). The mean maximum temperature is 27 °C and minimum is 16 °C (Kshatriya *et al.*, 2006).

3.2.3 Population and ethnicity

According to 2012 national census the human population of Simanjiro district is 178 693(URT, 2012). The dominant ethnic groups in Simanjiro District are Maasai, other ethnic groups includes the Chagga, Arusha, Pare, Rangi and Iraqw.

3.1.4 Socio-economic activities

Apart from traditionally being pastoralists, few Maasai are now actively engaged in crop production. The crops grown in the area are maize, sesame, sunflower and beans. Other economic activities are business and employment.

3.2 Research design

The research design for this study is cross sectional design where by data was collected from selected respondents at one point in time. It is economical in terms of time and resources (Babbie, 1993).

3.3 Sampling procedure and sample size determination

Two study villages were purposively selected, first village which is Kimotorok was selected due to persistence of land use and boundary conflicts which had direct impacts to local communities, and second village which is Loiborsiret was selected because it has land conflicts which have no direct costs to the local communities. The list of households in updated villages register books were used as a sampling frame. Sampling unit was a household. Simple random sampling was used to select sample units. Sample size of this study was 120 respondents whereby 60 households were randomly selected from each study village. A lottery method was used to select the households. It is recommended in social science studies that at least 30 sample is enough for population representation

(Bailey, 1994). Purposive sampling procedure was used to select four key informants as it allows selection of key respondents who have adequate knowledge on the subject.

3.4 Questionnaire pilot testing

The pilot study was conducted in order to study the population characteristics, to check acceptability of the study, to correct the questions and pre- testing the questionnaire whether they are relevant and easily understood by respondents.

3.5 Data collection methods

3.5.1 Primary data

Primary data collected included respondents' socio-economic characteristics, drivers of land use conflict, costs and impacts of land use conflict on assets and income of local communities, current conflict resolution strategies, stakeholder's interest and positions over prevailing land use conflicts. The primary data were collected through interview using household questionnaire, focus group discussions (FGDs) and key informant interviews (KIIs).

3.5.1.1 Questionnaire survey

The study used semi-structured questionnaire (Appendix 1) to collect information. The questionnaire having a mixture of open and closed ended questions was used to obtain information on socio- economic characteristics of respondents, drivers of land use conflict, cost and impacts of conflict on assets and income of local community surrounding Mkungunero game reserve, current conflict resolution strategies and stakeholders' interest as well as positions over prevailing land use conflict.

3.5.1.2 Focus group discussions

A focus group discussion of 7 people was carried out by using checklist (Appendix 2). Krueger *et al.* (2009) pointed out that focus group discussion should have 7-10 people. A

focus group of 7 people from each study village was carried out to collect information about drivers of land use conflict, costs and impacts of the conflict on the assets and income of local community, current conflict resolution strategies and stakeholders' interest as well as positions over prevailing land use conflicts.

3.5.1.3 Key informants interviews

Key informants interview was conducted through checklist (Appendix 3, 4 and 5) and it included Village Executive Officer of Loiborsiret and Kimotorok, Simanjiro district land officer as well as project manager of Mkungunero Game reserve.

3.6 Data analysis

3.6.1 Drivers of land use conflict between local communities and management of Mkungunero game reserve

Multiple regression model was used to determine the existence of correlation between land conflict drivers and land use conflict. Regression analysis was run to assess the influence of independent variables (land conflict drivers) on dependent variable (land use conflict). Mathematically the model is represented as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon \dots \dots \dots (1)$$

Where; Y = Land conflict, β 's = coefficients to be estimated, β_0 = constant coefficient (intercept of the equation), X_1 = education level of household head, X_2 = household size, X_3 = grazing area, X_4 = agriculture area, X_5 = distance from game reserve, X_6 = settlement area, X_7 = number of livestock, X_8 = fuel wood and ε = random error.

3.6.1.1 Variable description used in the model

The study speculated that the existence of land use conflict between local community and management of Mkungunero game reserve is influenced by number of socio economic

factors used in this study as explanatory variables. The basis for the assumption of these variables was theoretical considerations found in the literature.

3.6.1.1.1 Education level of household head

Education level of household head was measured in terms of level of education attained by household head. Education plays significant role in increasing the awareness on conservation and laws governing protected areas. Those with formal education were expected to have positive attitude towards conservation and they cannot be involved in the conflict with PAs. A study by Kideghesho *et al.* (2007) report that community members with higher levels of education have more positive perceptions of PAs and conservation than those with lower levels of education and better educated residents have access to better employment, providing alternative livelihood strategies that reduce dependency on resources from PAs for survival.

3.6.1.1.2 Household size

Household size is a continuous variable. Land conflict occurs due to resource scarcity ,as household size increases the population size increases therefore it is expected that there will be need for more land to increase production for food and increasing household income to meet population demand. Those with large household size are expected to have conflict due to need for more land. Mwesigye *et al.* (2013) found out that, communities that have more household members tend to have more land use conflicts than those with few household members.

3.6.1.1.3 Grazing area

Grazing area is expected to influence land conflict with the protected area positively. The more the grazing area is required then it is likely for the household to be involved in

conflict due to search for pasture. A study conducted by Kideghesho *et al.* (2013) found that, eviction of Maasai pastoralists from the Tarangire National Park in 1996 has created tension between park managers and pastoralists because the area was used for grazing by Maasai.

3.6.1.1.4 Agriculture area

Agricultural area is expected to have positive influence on the land conflict between local community and game reserve. The more the agricultural area is required then it is likely to be involved in conflict due to competition over the resource among stakeholders. Nyamasyo *et al.* (2014) showed that in Kimana wetland ecosystem agricultural expansion has increased from 69.97 km² in 1980 to over 438.17 km² in 2013 suggesting that irrigated agricultural expansion is one of the major causes of land use change which in turn can lead to conflict with the protected area.

3.6.1.1.5 Distance to the game reserve

Distance to game reserve is the location of household from the game reserve and is measured in kilometers. The closer the household to game reserve, the more would be likely to enter in game reserve to find resources due to dependence of rural community on natural resources leading to conflict with game reserve authority. Therefore in this study living close to game reserve is positively related to conflict. Study conducted by Ongugo *et al.* (2008) in Mt. Elgon forest observed that about 5000 people living near the national park (1-5 km) depend on the national park for their livelihoods. Most people depend on the forest mainly for subsistence products such as firewood, poles and posts, water, game meat, medicinal plants which are obtained illegally from the forest resulting to conflict between local communities and managers of protected areas.

3.6.1.1.6 Settlement area

Settlement area is expected to have positive influence on the land use conflict because if communities have already settled in the area without knowing it is a protected area then they will have resistance to live area because they have established their settlement in the area. Study conducted by Kumssa *et al.* (2014) in Abijata-Shala lakes national park found out that beside other factors, restriction of settlement created conflict between park management and local community.

3.6.1.1.7 Number of livestock

Number of livestock is a continuous variable and is measured in term of number of animals that a household owns. This variable is expected to influence the land use conflict positively because as the number of livestock increases the more area is needed for grazing. Study by Lawuo *et al.* (2014) found that among the reason for land use conflict between Maasai community and NCAA is the number of livestock. The result on number of livestock revealed that there was a total of 11 452 livestock in 2010 signifying that number of livestock is bigger compared to the area located to them since the livestock are not allowed to be grazed in NCA but the pastoralists pastured their livestock within the crater and the forest that lead to increase and persistence of land use conflict.

3.6.1.1.8 Fuel wood

This is a dummy variable that takes a value of one if the household is depending on the game resources for collection of fuel wood and zero otherwise. Those depending on game reserve for fuel wood collection are expected to engage in conflict because it is not allowed to collect fuel wood inside game reserve. The firewood collectors collect firewood from the forest this shows the dependence people have on the forest for their sustenance, therefore conflicts arise between the users and the forest department whose main goals are to conserve the forest Ongugo *et al.* (2008).

3.6.2 Impacts and costs of the land use conflict on assets and income of local community surrounding game reserve

Impacts and costs of the land use conflict on assets and income of local community surrounding game reserve were analysed using descriptive statistics and results were summarized in form of tables and charts. T- test analysis was employed to test if there is significant difference on income and consumption between the respondents who were affected by conflict and those who were not affected by conflict.

3.6.3 Conflict resolution strategies, stakeholders' interest and positions over prevailing land conflict

Current conflict resolution strategies, stakeholders' interest and positions over prevailing land use conflicts were analysed using descriptive statistics and results were summarized in form of tables and charts. Descriptive analysis using SPSS was employed to all data from questionnaire where by frequencies and percentages were calculated. Content analysis was used to analyse data from focus group discussion and key informants interviews.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Socio-economic characteristics of respondents in the study area

The characteristics of respondents have important implication in the land use conflict. This section describes the characteristics of sampled households based on sex, age, marital status, household size, educational level and economic activity.

4.1.1 Sex of the respondent

Sex has implication on the roles and responsibilities in the society therefore can influence respondents' ability to engage in conflict. Results in (Table 1) show that in Kimotorok male encountered were 100% of the respondents and in Loiborsiret male encountered were 80% while female encountered were 20% of the respondents. Large percentage of male respondents during survey may be due to the fact that in Maasai community the issues regarding land ownership and land conflict are mostly concerned with men and they are ones responsible in giving out information regarding the family issues.

4.1.2 Age of respondent

The results in (Table 1) shows that the age of respondents in the study area is between 18-25, 26-33, 34-41,42-50 and above 50 years and the majority of respondents in both villages are found in the group of between 34-41 years. This implies that many respondents in the study area are mature people who have stayed in the area for a long time.

4.1.3 Marital status of respondents

Marital status of respondents was categorized as single, married, divorced and widowed. Results indicated that majority of respondents in both villages were married, 98.4% in

Kimotorok and 91.7% in Loiborsiret (Table 1). Only 1.6% of respondents in Kimotorok were not married. In Loiborsiret 3.3%, 1.7% and 3.3% of respondents were single, divorced and widowed respectively. Marital status may cause someone to be involved in land conflict because someone has to acquire more land to generate more income and food to meet various household needs and increasing their house hold income base.

Table 1: Respondents socio-economic characteristics in Kimotorok and Loiborsiret (N=120)

Variables	Kimotorok	Loiborsiret	χ^2
Sex			0.001
• Male	60 (100)	48 (80)	
• Female	0 (0)	12 (20)	
Age (years)			0.675
• 18-25	3 (5)	6 (6)	
• 26-33	14 (23.3)	11 (18.3)	
• 34-41	20 (33.4)	17 (28.4)	
• 42-50	18 (30)	13 (21.7)	
• Above 50	5 (8.3)	13 (21.6)	
Marital status			0.306
• Single	1 (1.6)	2(3.3)	
• Married	59 (98.4)	55 (91.7)	
• Divorced	0 (0)	1 (1.7)	
• Widowed	0 (0)	2 (3.3)	
Household size			0.963
• Less than 4	13 (21.7)	14(23.3)	
• 5-8	25 (41.6)	17 (28.4)	
• More than 8	22 (36.7)	29 (48.3)	
Education level			0.198
• None	49 (81.7)	43 (71.6)	
• Primary education	9 (15)	12 (20)	
• Secondary education	2 (3.3)	5 (8.4)	
Economic activity			0.517
• Pastoralist	3 (5)	2 (3.3)	
• Agriculture	3 (5)	1 (1.6)	
• Agro-pastoralist	54 (90)	56 (93.4)	
• Employment	0 (0)	1 (1.6)	

In brackets are percentages

4.1.4 Household size

The household compositions considered in the study area were groups who live together and share the resources like accommodation and food. Results from (Table 1) show that most households in the study area have between 5-8 persons and more than 8 persons. This might be influenced by Maasai culture of polygamism. Household size may cause someone to be involved in land use conflict because someone has to acquire more land for food production, grazing as well as increasing their household income.

4.1.5 Educational level of respondents

Education level plays important role in increasing awareness about conservation of natural resources. Results in (Table 1) shows that 81.7% of respondents from Kimotorok and 71.6% of respondents from Loiborsiret have no formal education. Lack of formal education may influence people to engage in conflict due to lack of knowledge on conservation and laws governing protected areas.

4.1.6 Economic activity of respondents

Majority of respondent's economic activity in both villages are agro-pastoralist (Table 1). Results show that 90% and 93.4% of respondents in Kimotorok and Loiborsiret respectively are agro-pastoralists. This may be due to the fact that traditionally Maasai are pastoralists but recently they are engaging themselves in small scale agriculture. Agro-pastoralism may influence land conflict due to need for land for grazing and fertile soil for agriculture hence entering in game reserve boundaries.

4.2 Drivers of land use conflict between local communities and management of Mkungunero game reserve

4.2.1 Drivers of land use conflict between local communities and management of Mkungunero game reserve

The model summary in Table 2 shows that the independent variables (land conflict drivers) fit well in the regression model in that R square was 0.713. This means that the fit explains 71.3% of the total drivers of land use conflict which were explained by the tested factors. The adjusted R square of 0.692 show that there is correlation between land use conflict and explanatory variables.

Table 2: Model summary for drivers of land use conflict in the study area

Model	R	R Square	Adjusted R Square	SE
	0.844	0.713	0.692	0.274

Table 3 summaries the factors that influence local community in Kimotorok village to have land use conflict with Mkungunero game reserve. As indicated in Table 3 explanatory variables (land conflict drivers) that influences land use conflict significantly at 5% are household size, distance to game reserve, number of livestock, area for crop production, settlement area and grazing area.

Table 3: Multiple regression results for drivers of land use conflict between local community in Kimotorok village and management of Mkungunero game reserve

Variables	β	Std. Error	Beta	t	Sig
(Constant)	1.177	0.190		6.200	0.000
Household size	-0.011	0.005	-0.117	-1.983	0.050**
Education level	-0.007	0.057	-0.007	-0.124	0.902
Distance to game reserve	0.031	0.005	1.001	5.878	0.000***
Fuel wood	-0.304	0.159	-0.308	-1.915	0.058
Number of livestock	0.000	0.000	0.117	2.067	0.041**
Area for crop production	-0.193	0.155	-0.193	-1.243	0.027**
Settlement area	0.193	0.079	0.185	2.442	0.016**
Grazing area	0.128	0.152	0.129	0.841	0.040**

Note: ***, **, and * Significant at 0.01, 0.05 and 0.1 levels respectively.

4.2.1.1 Household size

The results suggest that land use conflict between local community and management of Mkungunero game reserve is significantly influenced by size of household which is consistent with the priori expectations. The results shows household size to be negative and significant at $p \leq 0.05$. This implies that as household size decreases then engagement of household members in land use conflict decreases. An explanation behind the observed relationship is that for the household that has small household size, the less the land is required for food production and vice versa for the household with many members. As household size decreases also the population size at the particular area decreases this will decrease demand for land to meet the population consumption needs. Requirements for addition land force people to invade protected areas for supporting their livelihoods hence accelerates land use conflict. Studies by Enang (2013); Siyum (2015) asserted that, population as the main determinant of communal land conflicts as excess population would eventually result in severe pressure on the environment and possibly generate

conflict. Mwesigye *et al.* (2013) found out that communities that have more household members tend to have more land use conflict than those with few household members.

4.2.1.2 Distance to game reserve

On the other hand distance from household and game reserve is positive and highly significant $p \leq 0.01$ on the household's member to engage in land use conflict. This implies that the closer the household to the game reserve the higher the propensity to be involved in land use conflict. Households who live close to game reserve are likely to have conflict because they depend much on game reserve resources compared to those living far from game reserve. Households who live close to game reserve utilises different resources in the area like fuel wood, pastures for livestock and fertile soil in the area. This is due to the fact that other areas surrounding village are already occupied and others are not suitable for agriculture and livestock keeping. Study conducted by Ongugo *et al.* (2008) found that people living near the national park depend mainly on forest for subsistence products such as firewood, poles and posts, water, game meat, medicinal plants.

4.2.1.3 Number of livestock

The regression results further indicate positive and significant relationship between land use conflict and number of livestock $p \leq 0.05$ which is consistent with prior expectation. The relationship implies that increase in number of livestock raise land use conflict with game reserve management. This relationship is mostly likely due to the fact that number of livestock increases while the area remains constant resulting to resource scarcity to meet the demand of livestock. Land scarcity increases competition between land users triggering pastoralists to enter within game reserve boundaries finding pastures for their livestock resulting into conflict with game reserve management. Findings of Lawuo *et al.* (2014) asserts that in Ngorongoro number of livestock is bigger compared to area located

to them that lead to increase and persistence of land use conflict. Furthermore, need for water cause pastoralists to shift to reserved and controlled area leading to persistence of the land use conflict (Lawuo *et al.*, 2014).

4.2.1.4 Grazing area

Regression results indicated that land use conflict is positively and significantly influenced by grazing area $p \leq 0.05$. The plausible explanation behind this relationship is that as the number of livestock increases also more area is needed for grazing causing pastoralists to enter in game reserve resulting into conflict. The eviction of local community from Mkungunero game reserve in 2006 caused the pastoralists to lose the area for grazing. Furthermore, other areas surrounding MGR are already occupied by other communities, this increase conflict due to dependence on the area to support their livestock. Also during dry season pastoralists enter in protected area to find pastures. A study conducted by Kideghesho *et al.* (2013) found that eviction of Maasai pastoralists from the Tarangire national park in 1996 has created tension between park managers and pastoralists whose productive grazing areas have been taken.

4.2.1.5 Area for crop production

In regards to area for crop production, findings from the study depict negative relationship with land use conflict and statistically significant at $p \leq 0.05$. An explanation behind the observed relationship is that the less pressure on area for crop cultivation is likely to reduce land use conflict. Odhiambo (2008) found out that competition of land for grazing between local community and conservation in Ngorongoro conservation area results into land use conflict. The more the agricultural area is required then it is likely to be involved in conflict due to competition over the resource among stakeholders. Nyamasyo *et al.* (2014) showed that in Kimana wetland ecosystem agricultural expansion has increased

and communities has encroached the areas for agriculture expansion which in turn can lead to land use conflict with the protected area.

4.2.1.6 Settlement area

Findings also revealed that settlement area influence land use conflict positively and significantly at $p \leq 0.05$ and it is consistent with prior expectation. A possible explanation is that an increase in demand for settlement area increases land use conflict due to the fact that community encroach game reserve area. Study conducted by Kumssa *et al.* (2014) in Abijata –shalla lakes national park found out that beside other factors restriction of settlement created conflict between park management and local community.

4.3 Detecting multicollinearity

To detect the problem of multicollinearity in the independent variables influencing land use conflict variance inflation factor (VIF) was employed.

$$VIF = \frac{1}{1-R^2} \dots\dots\dots(2)$$

$$VIF = \frac{1}{1-0.692} = 3.23.$$

The VIF value of 3.23 indicates the absence of multicollinearity problem. Several researchers (Craney and Surles 2002; Murray *et al.*, 2012; Yakubu, 2009) have suggested that the typical cut-off values (or rules of thumb) for large VIFs of 5 or 10 indicate presence of multicollinearity which are based on the associated R^2 of 0.80 or 0.90, respectively. The VIF values below the cut-off value (0.323) indicate no multicollinearity problem.

4.4 Costs and impacts of land use conflicts on Mkungunero game reserve and on the assets and income of local communities around game reserve

The survey in the study area established that local community in Kimotorok village has been impacted by the land use conflict. The research findings indicate that 82% of the interviewed local communities have been affected by the land use conflict and 18 % of respondents were not affected by the land use conflict (Fig. 2). This is because local communities were excluded inside the game reserve which they depend on to support their livelihood in addition their properties were destroyed during exclusion. Exclusion of local communities which is associated with destruction and loss of properties increases poverty resulting to more dependence on natural resources. Evicted pastoralists who move to new areas mostly face loss of livestock due to diseases, inadequate forage as well as water resources and unsuitable condition for livestock keeping resulting into food insecurity due to loss of livestock. These results are consistent with the results of Opuku (2015) which shows that land use conflicts affects livelihood in different ways leading to food insecurity and increased poverty.

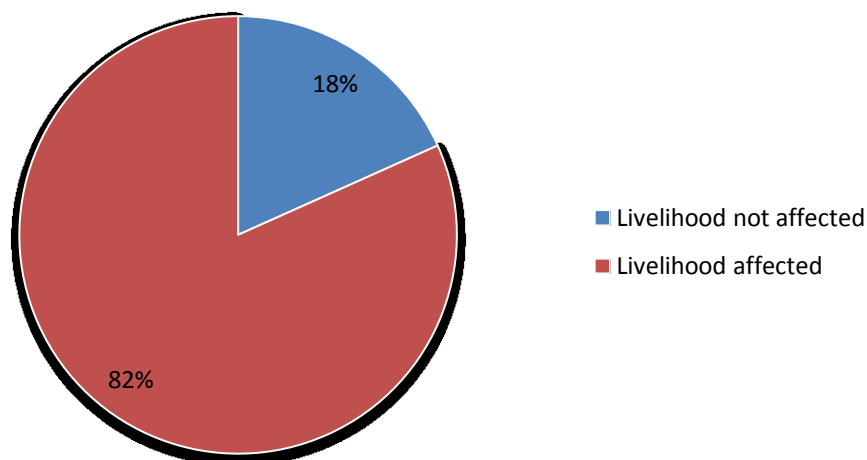


Figure 2: Percentage of local community in Kimotorok village affected by land use conflict

Further the results in (Table 4) shows that local communities in Kimotorok village were impacted in different ways with these land use conflicts. The results indicated that 65% of the respondents experienced declining of children's education, 35% were physically injured, 78% abandoned their farms, 71% of respondents their houses and properties were destroyed during exclusion within the boundaries of game reserve, 85% respondents reported that there was reduction in food quality and quantity because they depend mostly on the area they are contesting for agriculture and grazing.

Decline in childrens education occurred because childrens abandoned school due to insecurity and displacement of families which were evicted leading to low education, this will results to community dependence only on livestock as source of income. Dependence on livestock as source of livelihood increases poverty putting more pressure on natural resources and environment. Abandonment of farms has economic impact to local community in terms of time and money wasted on investments in agricultural inputs; also it results in reduction of food quality and quantity. Physical injuries are cost to households because it interferes with production causing failure to perform economic activities due to injuries affecting the flow and allocation of resources. Destruction of properties and houses has negative impact to community because they have to replace the lost and destroyed properties instead of investing in other productive economic activities. Odhiambo (2008) reported the same results that socio-economic impacts of conflicts cause increased poverty and livelihoods insecurity.

Table 4: Impacts of land use conflict to local community in Kimotorok

Impacts	N=60
Decline in children's education	39(65)
Physical injuries	21(35)
Farm abandonment	47(78)
Destruction of properties	43(71)
Decline in food quantity and quality	51(85)

In brackets are percentages

4.4.1 Crops destroyed during the conflict in Kimotorok village between 2008 and 2015

The study findings established that 51.7% of the respondents crops were destroyed between 2008 and 2015 while 48.3% their crops were not destroyed (Table 5).

Table 5: Crops destroyed during conflict in Kimotorok between 2008 and 2015

Crops destroyed during conflict	N=60
No	29(48.3)
Yes	31(51.7)

In brackets are percentages

The crops destroyed included beans, maize and sesame during the land use conflict because the farms which were inside the area which has conflict were burned and some respondents left the crops in the farms. The destruction occurred because local communities were resistant to live the area.

Table 6: Crops destroyed during the conflict in Kimotorok village between 2008 and 2015

Crop	Acres	Total loss (TZS)
Beans	23 (5.5)	4 045 000(6.4)
	Mean	0.38
	Median	0
	Std	1.63
Maize	230(54.6)	31 235 000(50.6)
	Mean	2.8
	Median	3
	Std	4.7
Sesame	168(39.9)	27 110 000(43)
	Mean	3.8
	Median	0
	Std	4.5

In brackets are percentages

The acres of beans destroyed were 23 acres (5.5%), maize 230 acres (54.6%) sesame 168 acres (39.9%) (Table 6). The loss due to destroyed crops in that period were beans 4 045 000 TZS (6.4%), maize 31 235 000TZS (50.6%) and sesame 27 110 000TZS (43%) (Table 6). The loss comprised the management cost and amount of bags expected and the income expected from the crops. Destruction and loss of crops due to land use conflicts affect food production at the household level due to a reduction in the quantity of crops produced. Reduction in quality and quantity of crops leads to food insecurity and poverty which cause farmers to fail to purchase and use agricultural inputs to increase crop production. Food insecurity and income poverty resulting from this scenario may force people to depend more on natural resources. Also destruction of crops discourages farmers to invest on agriculture due to fear of wasting time and money causing to low production. The results are consistent with Oruenye (2012) which shows that, farmlands were burnt and destructed during land use conflict resulting to food insecurity.

4.4.2 Livestock destroyed during conflict in Kimotorok between 2008 and 2015

The results in (Fig. 3) shows that 52% of respondent's livestock's were destroyed while 48% of the respondents their livestock's were not destroyed, the livestock destroyed were cattle, goats and sheep.

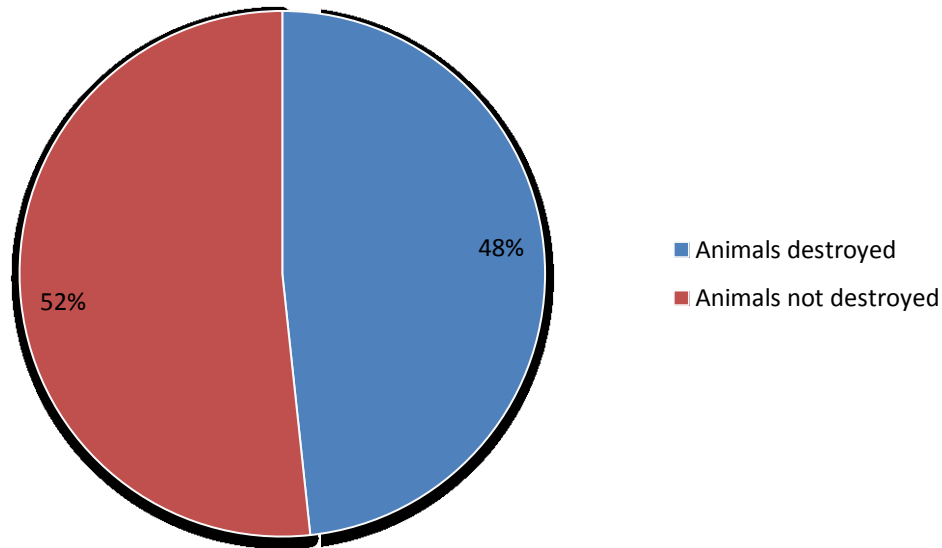


Figure 3: Livestock destroyed in Kimotorok during conflict

Further the study established different types of livestock destroyed, their number and their approximate value. Results in Table 7 shows that, of the interviewed respondents whose livestock were destroyed majority were goats 310 (69.2%), while 52 (11.6%) were cattle and 86 (19.2) were sheep. The livestock were destroyed due to burning of bomas for those people who were resistant to live the area.

Table 7: Number of livestock destroyed during conflict and their approximate value in Kimotorok between 2008 and 2015

Livestock	Number	Total value(TZS)	Total value(TZS)	
			Sample Mean	Std
Cattle	52(11.6)	26 700 000(61.5)	445 000	1 291 619
Goat	310(69.2)	13 190 000(30.4)	219 833.3	316 858.2
Sheep	86(19.2)	3 520 000(8.1)	58 666.6	122 650.3
Total	448	43 410 000		

In brackets are percentages

Results in Table 7 shows that the number of livestock destroyed were 52 (11.6), 310 (69.2) and 86 (19.2) for cattle, goat and sheep respectively. Further the results in Table 7 shows

the values of livestock destroyed during conflict were cattle 26 700 000 TZS (61.5%), goats 13 190 000 TZS (30.4%) and sheep 3 520 000 (8.1%). The value is approximated from the market price of each animal and the number of animals destroyed. Destruction and loss of livestock cause reduction in livestock which is critical to Maasai pastoralists because they depend on them as the main livelihood resource. Also loss of livestock increases the chances of food insecurity because they depend on them as the main source of food. This creates more tension between game reserve management and local community. Loss of livestock results into increased poverty and livelihoods insecurity which undermines opportunities for other development activities. The results are consisted with those of Omosa (2005) which shows that 39% of respondents said they have lost livestock during conflicts the number of lost livestock ranged from 2 to 230.

4.4.3 Properties destroyed during conflict in Kimotorok village between 2008 and 2015

During conflict with the management of Mkungunero game reserve different local community properties were destroyed due to exclusion of villagers within the boundaries of the reserve. Fig. 4: shows that 57% of respondents interviewed their properties were destroyed and 43% their properties were not destroyed.

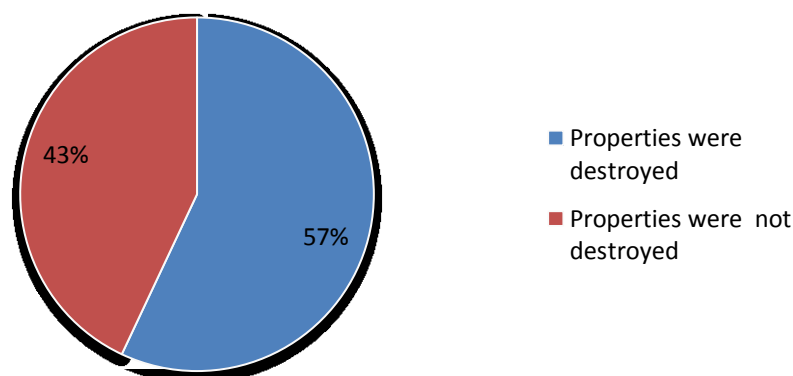


Figure 4: Destruction of properties in Kimotorok

The survey in Kimotorok found that different properties that were destroyed and lost during land use conflict were bicycles, houses, money (cash), ox-plough, fly sheets, utensils and bags. The number of destroyed bicycles were 8 (1.7%), houses 79 (17.7%), money (cash), ox-plough 4 (0.9%), fly sheet 57 (12.7%) and others 298 (66.8%) as shown in Table 8.

Table 8: Destroyed properties during conflict and their approximate value in Kimotorok between 2008 and 2015

Property	Number	Approximate total value (TZS)	Approximate total value sample mean (TZS)
Bicycle	8 (1.7)	1 260 000 (3.79)	21 000
Houses	79 (17.7)	19 640 000 (59.1)	327 333.3
Money(cash)	-	3 300 000 (9.9)	55 000
Ox- plough	4 (0.9)	500 000 (1.5)	8 333.3
Fly sheets	57 (12.7)	1 265 000 (3.8)	21 083.3
Others	298 (66.8)	7 270 000 (21.8)	125 344.8
Total	446	33 235 000	

In brackets are percentages

The approximate value of destroyed properties as shown in Table 8 were bicycles 1 260 000 TZS (3.79%), houses (boma) 19 640 000 TZS (59.1%), money (cash) 3 300 000 TZS (9.9%), ox-plough 500 000 TZS (1.5%), Fly sheets 1 265 000 TZS (3.8%) and others 7 270 000 TZS (21.8%). Respondents reported that the properties were burnt within houses and others lost their properties during eviction within the boundaries of MGR rendering affected households homeless. The destructions and loss of properties is cost to the community because the resources which were for other development activities and investment in livelihood promoting activities were diverted in recovering the destructed as well as lost properties indicating that the prevalence of conflicts create a vicious circle, putting more pressure on the natural resource base and the environment leading to more

conflict. Oruanye (2012) shows that conflicts between local communities over land use has resulted in burnt down of houses, while others lost their source of livelihood. Furthermore, result shows that 552 houses were burnt down during conflict and destructions resulting from the conflict were estimated to be about twenty two million, one hundred and forty thousand six hundred naira N 22, 140 600.

4.4.4 Time lost by local community in land use conflict resolution in Kimotorok village

During conflicts local community in Kimotorok village uses time in resolving conflicts. From the study it was found that the respondents use average of 3 hours per day, 2 days per week and about 29 hours per month to resolve land use conflict with Mkungunero game reserve management (Table 9). During discussion it was found that when the conflict persists they can use even the whole month in resolving land use conflict with MGR. The results are consistent with Omosa (2005) showing that it takes an average of five weeks to negotiate out of a conflict when water conflicts occur in Wajir District in Kenya. The time spent in resolving conflict is high price for pastoralism, an activity whose success depends on availability of time and labour to cover long distances in search of water, pasture and physical security. Time households waste in conflict can be used to do other productive economic activities to increase household income.

Table 9: Time lost in conflict resolution by local community in Kimotorok village

	Hours per day	Number of days per week	Total hours per week	Total hours per month
Mean	3.55	2	7.4	29.4
Std	0.79	0.65	3.1	12.5

4.4.5 Impacts of land use conflict on income of local community in Kimotorok and Loiborsiret

The study further investigated if the conflict has affected the income of local community and if there is significant difference between respondents who faced the land use conflict and those who did not have the conflict. The village which has conflict is Kimotorok and Loiborsiret has no conflict.

4.4.5.1 T-test for comparison of income per month between Loiborsiret and Kimotorok

An independent sample T- test was carried out to test if conflict has impact on income. Findings in Table 10 Indicate statistically insignificant results at $P < 0.05$ meaning that income per month between respondents who have conflict and those who have no conflict are statistically not different. This implies that despite conflict in Kimotorok village their mean income per month is not different meaning that conflict has no impact on income.

Table 10: Means comparison results for income per month between Loiborsiret and Kimotorok

Villages	Mean	Standard deviation	Standard Error Mean	t	df.	Sig.
Loiborsiret	327000	243235.95	31401.63	-1.418	118	0.617
Kimotorok	386666.6	216846.94	27994.82			

4.4.5.2 T-test for comparison of income obtained from crops in 2014/2015 between Loiborsiret and Kimotorok

An independent sample T- test was carried out to test if conflict has impact on income obtained from crops. Findings in Table 11 indicate statistically significant results at $P < 0.05$ meaning that income obtained from crops in 2014/2015 between respondents who

have conflict and those who have no conflict are statistically different. The reason behind the difference is that in Kimotorok village they grow sesame as a cash crop which increase income compared to Loiborsiret where they depend much on maize and beans which are used for consumption.

Table 11: Means comparison results of income obtained from crops in 2014/2015 between Loiborsiret and Kimotorok

Village	Mean	Standard deviation	Standard Error Mean	t	df.	Sig.
Loiborsiret	106583.33	367099.68	33511.46	-2.070	118	.001***
Kimotorok	403944.44	1543821.89	115069.68			

Note:*** Significant at 0.01 level

4.4.5.3 T-test for comparison of value of crops consumed in 2014/2015 between Loiborsiret and Kimotorok

An independent sample T- test was carried out to test if conflict has impact on value of consumed crops. Findings in Table 12 indicate statistically insignificant results at $P < 0.05$ meaning that value of consumed crops in 2014/2015 between respondents who have conflict and those who have no conflict are statistically not different. This implies that despite conflict the households were able to access and meet their consumption needs in village which has conflict and in village which has no conflict.

Table 12: Means comparison results of value of consumed crops 2014/2015 between Loiborsiret and Kimotorok

Village	Mean	Standard deviation	Standard Error Mean	t	df.	Sig.
Loborsiret	363416.66	415031.62	37887.03	-0.969	118	0.130
Kimotorok	415371.90	417454.67	37950.42			

4.4.5.4 T-test for comparison of income from livestock in 2014/2015 between

Loiborsiret and Kimotorok

An independent sample T- test was carried out to test if conflict has impact on income obtained from livestock. Findings in Table 13 indicate statistically significant results at $P < 0.05$ meaning that income from livestock in 2014/2015 between respondents who have conflict and those who have no conflict are statistically different. The reason behind their difference might be that in Kimotorok village which has land use conflict mean income from livestock is large due to the fact that villagers own more livestock meaning that they have more livestock to sell to increase their income compared to those in Loiborsiret village which has no land use conflict.

Table 13: Means comparison results of income obtained from livestock 2014/2015 between Loiborsiret and Kimotorok

Village	Mean	Standard deviation	Standard Error Mean	t	df	Sig
Loiborsiret	1057388.88	1552637.82	115726.79	-2.495	118	0.005***
Kimotorok	1569972.22	2277430.15	169749.62			

Note: *** Significant at 0.01 level

4.4.5.5 T-test for comparison of value of consumed livestock in 2014/2015 between

Loiborsiret and Kimotorok

An independent sample T- test was carried out to test if conflict has impact on value of livestock consumed. Findings in Table 14 indicate statistically insignificant results at $P < 0.05$ meaning that value of livestock consumed in 2014/2015 in Kimotorok village which is having conflict and Loiborsiret which did not have conflict are statistically not different. This indicates that despite conflict the households were able to meet their consumption needs.

**Table 14: Means comparison results of value of consumed livestock in 2014/2015
between Loiborsiret and Kimotorok**

Village	Mean	Standard Deviation	Standard Error Mean	t	df	Sig
Loiborsiret	394500	580160.85	43242.63	-0.718	118	0.078
Kimotorok	432472	408424.72	30442.18			

4.4.6 The impacts of land use conflict on Mkungunero game reserve

4.4.6.1 Impacts of land use conflict on wildlife

From discussion with key informants interview in Mkungunero game reserve it was found that the land use conflict has negative impact on wildlife. The impacts were fragmentation of habitat due to human activities in the area like agriculture, unnecessary migration, reduction of species diversity, poaching, competition of resources between wildlife and livestock and decrease of wildlife species. The loss of biodiversity is a threat to tourism in the area leading to decline in tourism revenues and local employment opportunities. The results affirms with Kerr *et al.* (2004); Regan, (2016) ; Mundia *et al.* (2009) where by these studies found out that there are declines in biodiversity due to agricultural expansion in PAs. Mundia *et al.* (2009) asserts that livestock population cause intensified competition with wildlife a leading to diminishing pastures and this is suspected to be causing more declines in wildlife population in Maasai Mara ecosystem.

4.4.6.2 Impacts of land use conflict on tourism

Through discussion with key informants from Mkungunero game reserve it was found that land use conflict with local community affected tourism activities in the area. The human activities inside the area were not friendly to wildlife leading to decrease in wildlife. Decrease of wildlife species and insecurity due to land use conflict caused tourism companies to withdraw from hunting. Also due to land use conflict there is shortage of

tourists' facilities in the area due to security reasons causing few tourists to visit MGR. These impacts in tourism led to decrease in revenue, loss of local employment opportunities and markets for local people to sell their products to tourists and different related tourism activities. The results are consistent with Crawford, (2012); Segan, (2012) which shows that loss of biodiversity present a threat to ecotourism and tourism, with subsequent decline in income from tourism and decrease in employment opportunities.

4.4.6.3 Impacts of land use conflict to workers and resources

Through key informants it was found that the conflict with surrounding community affected workers and increased management cost. The impacts were killings of 2 workers in 2007, kidnapping of workers, failure to conduct patrol, closing of roads and destruction of ranger posts. These impacts can cause reduction in the efficiency of resource management because workers are demoralized due to physical violence. Also it was found that the management costs increased in terms of time, money and resources because the patrol has to be conducted 24 hours per day throughout the year and all these require money and time. Increased management cost to cope with land use conflict has negative impact to MGR because the resources which are used in conflict resolution can be used in other activities which have ecological and economic benefits. Warner (2000) showed that conflict have impact on management in terms of increased time and costs of project operations.

4.5 Land use Conflict resolution strategies in Kimotorok village

Of the interviewed respondents 41.7% of respondents in Kimotorok village reported that there were no efforts to resolve land use conflict between them and game reserve because conflict still exists. While 58.3% reported that there were efforts for resolving the land use conflict (Table 15).

Table 15: Efforts in resolving conflict

Effort to resolve conflict	N=60
No effort in resolving conflict	25(41.7)
There is effort in resolving conflict	35(58.3)

In brackets are percentages

The resolution strategies reported were meetings with different leaders within and outside the village so that they can find solution regarding the boundary. Village government has sent representatives to present their problems in different authorities. Mkungunero game reserve management provided local community with conservation education so that they can understand the importance of conserving natural resources. Land survey by district land surveyors was conducted to establish boundaries. Building of dispensary by ministry of natural resources and tourism in Makinya village. These efforts of resolving the conflict were done by different stakeholders like Mkungunero game reserve management, village government, Regional commissioner, ministry of natural resources and tourism, member of parliament, traditional leadership, Prime minister's office, District council, Ward counselor, Land surveyors and PINGO. All these efforts in resolving these conflict have not yet found the permanent solution to this land use conflict due to political issues and contradicting boundaries between Manyara and Dodoma Region because in the government notes the game is declared in Kondo District but the boundaries of MGR enters Simanjiro district in Manyara region. Study by Lawuo *et al.* (2014) found that, different land use conflict resolution strategies in Ngorongoro conservation area like government involvement and stakeholders participation in conflict resolution.

4.5.1 Effectiveness of conflict resolution strategies

Results in Table 16 shows that 53.3% of respondents in Kimotorok village reported that efforts done by different stakeholders in resolving the conflict are not effective. They have reported that because there is still conflict between the community and game reserve

management, local communities are not allowed to conduct any activity in the area that they are contesting, other government authority they don't give the final decision on the conflict as to which between community or Game reserve have right over the area.

Table 16: Effectiveness of conflict resolution strategies between Kimotorok and Mkungunero game reserve

Effectiveness of resolution strategies	N=60
Effective	28 (46.7)
Not effective	32(53.3)

In brackets are percentages

Of the interviewed respondents 46.7% (Table 16) reported that the efforts in resolving the conflict are somehow effective because for now the conflict is not increasing and there is no restriction to graze in the area in which they are contesting. These efforts are not very effective due to political interference and stakeholders who are responsible for resolving this conflict do not agree on the means to finish the dispute. Lawuo *et al.* (2008) found out that despite different conflict resolution strategies between Ngorongoro conservation area and Maasai community there are still conflicts over the land in the area due to competing users.

4.5.2 Involvement of stakeholders in land use conflict resolution

Different stakeholders involved in conflict resolution between the Mkungunero game reserve management and local community in Kimotorok village were, 6.7% reported that not all stakeholders were involved, 90% all stakeholders were involved and 3.3% they don't know if stakeholders were involved in the land use conflict resolution (Fig. 5).

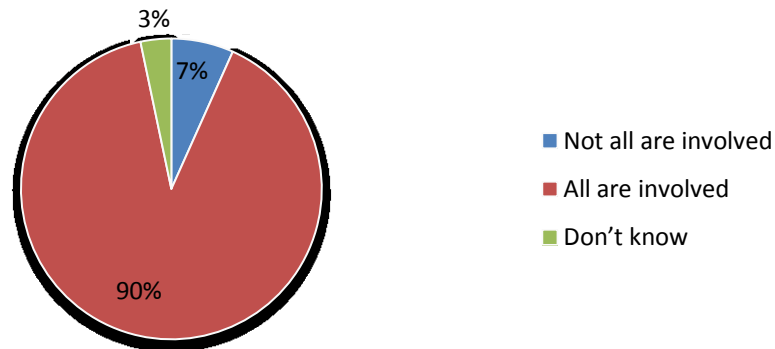


Figure 5: Involvement of stakeholders in conflict resolution between Kimotorok and Mkungunero game reserve

The stakeholders involved in resolving the land use conflict were Game reserve management, village government, Ministry of natural resources and tourism, District and Regional commissioner and PINGO who provided legal assistance to local community. This indicates that stakeholders are trying to resolve these conflicts but still these conflicts persist between local community and Mkungunero game reserve management. All stakeholders should be involved in each stage of resolving this land use conflict to obtain a permanent solution in which both stakeholders who are affected by the conflict will agree. Stakeholders can be involved in land use conflict resolution by providing local community with services like animal medicines, education to pastoralist on better method of livestock keeping, creation of different income generating activities, awareness on importance of conservation and community participation in management. Lawuo *et al.* (2014) asserts that, stakeholder's involvement in conflict resolution between NGAA and Maasai community has managed to reduce the conflict to some extent.

4.5.3 Condition of conflict in the study area

It was identified that 6.7% of respondents in Kimotorok village reported that conflict is decreasing because there is no exclusion from the area and there are to destruction of

properties. 93.3% of respondents reported that land conflict is normal and sometimes increases (Table 17). They suggest that conflict is normal and sometimes increases because they are not allowed to conduct any activity in the area and if found inside the contested area they are charged with fines.

Table 17: Condition of conflict between Kimotorok and Mkungunero game reserve

Condition of Conflict	N=60
Decreasing	4 (6.7)
Normal and increasing	56 (93.3)

In brackets are percentages

The reported condition of conflicts between Mkungunero game reserve and local community persist because there is no permanent solution reached due to political interference and people responsible for resolving this conflict give promises that they will come up with solution but they don't provide solution to the problem and they come to the area only when conflict rise. Responsible stakeholders should find a way to permanently solve this problem because when conflict arises both stakeholders involved in conflict incur costs like destruction and loss of properties, rise in management costs and habitat destruction.

4.6 Positions and interests of stakeholders in regards to the land use conflict in the study area

4.6.1 Positions of local community in regards to the land conflict

Through discussion with local community 5% and 1.7% of the respondents in both villages indicated that their position is maintaining the area under conservation and alternative land respectively (Table. 18). They suggested that because they think that conservation of resources is important for maintenance of biodiversity and they can obtain

benefits by having the game reserve through getting employment in different tourism companies.

Table 18: Positions of local community in Kimotorok regarding land use conflict with Mkungunero game reserve

Position	Frequency	Percentage
Maintain area under conservation	3	5
Alternative land	1	1.7
Re-gazetment of the area	56	93.3

Results show that 93.3% of respondents (Table. 18) in the study area indicated that their position are re-gazetment of the area in which they are contesting and it should be given to local community. The reason behind their position is that they have been living in the area for a long time and other areas are occupied by other people and it is difficult to start life in new areas because they have already invested much and they depend on the area for their livelihood. Furthermore they want to stay in the area because they claim that their village is registered and they own the area legally and the area is suitable for agriculture and grazing. Study conducted by Bragagnolo *et al.* (2016) established positions towards the park by local authority and local economy as reshaping of park size and restrictions on the local economy and need for more flexible measures for ecotourism development as the park constraints the development of ecotourism and related infrastructures.

4.6.2 Position of Mkungunero game reserve management

Results from key informant interview found that the position of Mkungunero game reserve management is that the area should be conserved because the area is important for biodiversity conservation and it was legally declared as game reserve. Because both stakeholders want to protect their interest it is important to find a resolution strategy which has benefits to both sides.

The results are consistent with Bragagnolo *et al.* (2016), showing that economic and social actors as well as park authority indicated their position in the park as the area should be protected for natural resources conservation while coping with human conservation conflicts and park authority stressed the need to ban the enlargement of grazing areas for protecting the island's biodiversity.

4.6.3 Interests of stakeholders in regards to the land use conflict

4.6.3.1 Interests of local community in Kimotorok regarding the land use conflict

10% and 90% of respondents in the study area suggested their interest as benefit sharing and protection of livelihoods respectively (Table 19). The reason behind their interest is that they have been living in the area for a long time and other areas are occupied by other people and they depend completely on the area for their livelihood and the areas available are not suitable for agriculture and grazing.

Table 19: Interests of local community in Kimotorok regarding land use conflict

Interest	Frequency	Percentage
Benefit sharing	12	10
Protection of livelihood	108	90

4.6.3.2 Interests of Mkungunero game reserve management

The interests of Mkungunero game reserve management are the government notes should be reviewed so that the villages which were allocated inside the reserve to know their boundaries to avoid confusion because the areas their contesting are critical for conservation. Another interest is that the conflict should be solved so that they can live in harmony with local community surrounding the areas. They suggest to live in harmony with the local community because if local community have negative attitude towards the game reserve it is possible for them to be involved in illegal activities which will impact

the wellbeing of the game reserve, therefore for sustainability of MGR it is important to have positive attitude from local community about conservation.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The main objective of this study was to assess land use conflicts between local communities and management of Mkungunero game reserve and their economic impacts. Specific objectives of the study were (i) to analyse drivers of land use conflict between local communities and management of Mkungunero Game Reserve (ii) to analyse costs impacts of land use conflicts on the assets on income of local communities around Mkungunero Game reserve and on conservation (iii) to assess current conflict resolution strategies undertaken in the study area and (iv) to assess the interests and positions of different stakeholders in regards to the conflict in the study area. The study was conducted in Kimotorok and Loiborsiret villages in Simanjiro district. Data were collected using semi structured questionnaire administered to 120 households. Multiple regression model was applied to assess the factors that influence conflict between game reserve management and local community. Results from multiple regression model shows that the variables that were statistically significant at 5% level of significance are family size (household size), distance to game reserve, number of livestock, grazing area, agriculture area and settlement area.

The study has found several costs and impacts resulted from the land use conflict. The impacts on the assets of local community were destruction of properties, destruction of livestock and crops. Other impacts were physical exhaustion, farm/job abandonment, decline of food quantity and quality, staying away from home and childrens abandoned school. Further the study found that community waste time in resolving the land use conflict instead of doing other productive activities. Further the study results of

independent sample T –test indicated that there were no significance difference in income per month between respondents who faced the conflict and those who did not face the conflict. The T-test results also shows that the income generated from crops and livestock in 2014/2015 was significantly different between respondents who have conflict and those who had no conflict. T-test for comparing value of consumed crops and livestock were insignificant. The impacts of conflict on game reserve were distraction of habitat, increase of management cost, poaching, decrease of revenue from tourism, decrease of wildlife, kidnapping of workers and destruction of ranger posts.

The study found that there were different conflict resolution strategies in the study area like provision of conservation education, meeting with different stakeholders, involvement of political leaders, land survey, establishment of beacons and building of laboratory and dispensary by ministry of natural resources and tourism to local community. The stakeholders involved in the resolution were Mkungunero game reserve management, village government, political leaders, PINGO and ministry of natural resources and tourism.

The study has found that the majority of local community position is re-gazetment of the area and the village to own the area while only few want benefit sharing and alternative land. The position of Mkungunero game reserve is that the area should remain as protected area as declared. The interests of majority of local community are protection of their livelihood and only few had interest in benefit sharing. The interests of Mkungunero game reserve management are that villages which are inside the boundaries of the game reserve to be removed from the area. Also they want the conflict to be resolved so that they can live in harmony with local community surrounding the areas for conservation to be sustainable. Therefore when resolving this land use conflict both stakeholders affected

should be involved in all stages and the solution should be beneficial and agreed to both sides.

5.2 Recommendations

Based on the findings of the study the following recommendations are made for decreasing conflict between local community and Mkungunero game reserve.

- i. Mkungunero game reserve should provide the better agriculture methods to local community like use of fertilizers order to reduce number of people entering in the game reserve to find fertile land.
- ii. The pastoralists should be provided with the education in order to improve awareness on importance of conservation and laws governing protected areas.
- iii. Mkungunero game reserve management should be strong in implementation of its rules and regulation and villages inside the area should be relocated to other areas.
- iv. All stakeholders in the area should participate in conflict resolution rather than just giving information, this will enable the local people to participate in decision making and get better solution.
- v. Mkungunero game reserve should provide local community with means to establish diverse livelihood activities like establishment of different income generating activities and provision of tangible benefits to reduce the dependence on livestock only and on natural resources.

- vi. The government should make livestock population a priority agenda because it is one of the underlying sources of land use conflicts in protected areas by implementing the active policies aiming at reducing pastoralists immigrants to move close to PAs. Also there should be a policy on how many livestock a person has to own in order to reduce the number of livestock and pressure around protected area.

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APPENDICES

Appendix 1: A questionnaire administered to households in the study area

Introductory information to respondents

My Name is Sarafina Isdori I am a student from Sokoine University of Agriculture, doing my research in your village as a requirement for my study. I have come to your household to discuss with you some issues regarding land use conflict between villagers and Mkungunero Game Reserve. I kindly request your time to make this discussion possible.

Village..... Ward..... Division.....

Section A. Background information

- 1) Sex: Female () Male ()
- 2) Age.....
- 3) Marital status a) Married () b) Single () c) Divorced () d) Widowed () e) Separated ()
- 4) What is your household size? a) Less than 4 persons () b) 5-8 persons () c) more than 8 persons ()
- 5) What is your education level? (a) None () b) Primary Level () c) Secondary () d) Post-secondary ()
- 6) Are you native in this village? a) Yes () b) No () If no, when did you move to this village?
- If yes how long have you stayed in this village? a) Less than 3 years () b) 3-6 years () c) 7-10years () d) more than 10 years ()
- 7) What is the distance between your household area and the boundaries of the game reserve? a) Less than 1 km () b) 1-2 km () c) 3-5 km () d) more than 5 km ()
- 8) What is your main livelihood activity? /What are the main sources of cash income for your household? (a) Pastoralism () (b) Agriculture () (c) Agro-pastoralism () d) Employment () e) Hunting () f) Business () g) Others (specify).....
- 9) Do you own land? a) Yes () b) No ().
- If yes what is the size of the land do you own? a) Less than 5 acres () (b) 5-10 acres () (c) More than 10 acres ()
- 10) What kind of right do you have in this area?
- 11) How long have you had that right? a) Less than 2 years () b) 2-5 years () c) 6-9 years () d) more than 9 years ()

12) How did you get it? a) Natural right () b) Inherited () c) Buying () d) Others (mention).....

Section B. Drivers of land use conflict

13) Do you know the boundaries of the park? a) Yes () b) No ()

14) When making the boundaries were you involved? a) Yes () b) No ()

15) Between the village and the Game reserve which was the first in the area? a) Game Reserve () b) Village () c) I don't know ()

16) Are you using natural resources within the area which has conflict?

a) Yes () b) No ()

If the answer is yes for question 16 what resources/services do you get within area?

Resource	Medicine	Bush meat	Building materials	Fuel wood	Honey	Water	Worship	Others (mention)

17) Do you practice agriculture a) Yes () b) No ()

If yes what major crops do you grow? a) Maize () b) Beans () b) Sunflower () c) Sesame () d) Others (Specify).....

18) Do you own livestock? a) Yes () b) No ().

If yes, what types and number of livestock do you own?

Type of livestock	Cattle	Goat	Sheep	Donkey	Others(mention)
Tick					
Number					

19) Have you/ any of your household members been engaged in land conflict with the game reserve authority? a) Yes () b) No ()

If yes, how many times did you or your family was engaged in the conflict

Frequency in year	Very often(more than 5 times per year)	Often(between 2-5 times per year)	Rare(less than 2 times per year)

20) In which year did conflict start?

21) What were the reasons for the land conflict between Mkungunero Game Reserve and your community? a) Source of water () b) Grazing area () c) Agricultural area () d)

Fuel wood collection () e) Settlement area () f) Others (mention)

.....

Section C. Impacts and costs of land use conflict on assets and income

22) Is your livelihood affected by land use conflict? a) Yes () b) No ()

23) If yes what are the impacts which has been caused by these conflicts?

a) Declining quality of children's education () b) Physical injuries () c) Reduction in food quality\quantity () d) Farm\job abandonment () e) Staying more away from home () f) others (specify).....

24) Were/Are your crops destroyed during conflict? a) Yes () b) No ()

If yes what type of crops were destroyed, their acreage, cost and income expected?

Crop	Maize	Beans	Sunflower	Sesame	Others
Acreage					
Cost/acre					
Income expected					

25) Were/Are your animals destroyed during conflict? a) Yes () b) No ()

If yes fill the table below

Type of livestock	Number destroyed	Year	Approximate value(TZS)
Cattle			
Goats			
Sheep			
Others(specify)			

26) Were your properties destroyed during conflict? a) Yes () b) No ()

If yes fill the table below

Name of property	Number	Year of destruction	Current value(TZS)
House			
Bicycle			
Motor bicycle			
Ox plough			
Others(mention)			
Others(mention)			

27) How much time did you use for conflict resolution in this year?

Hours per day	Number of days per week	Total hours per week	Total hours per month

Section D. Conflict resolution strategies

28) Do you have any legal office for resolving conflicts in your village?

- a) Yes () b) No ()

If not, how do you resolve conflicts?

29) When conflict arise do you report them a) Yes () b) No ()

If yes, what measures were taken?

30) How would you describe the involvement of all key stakeholders in the conflict resolution process? a) Not all are involved () b) All are involved ()

b) Don't know ()

31) Which methods are used for conflict resolution? (Tick one or more of suggestions below)

Method	Tick for used	Very effective	Effective	Not effective
Community meetings				
Traditional leadership				
Local /political leadership				
Others (mention)				

32) What can you say about the land conflicts cases in your village are they

- a) Decreasing () b) Normal () c) Increasing ()

Section E. Position and interests of stakeholders on the land use conflict

33) What is your position regarding to this existing land use conflicts?

- a) Maintain current land area under wilderness conservation ()
 b) Reduce current conservation land area () c) Increase current conservation land ()
 d) Alternative land () e) Don't know () f) Others (specify)

What are the reasons for your option?.....

34) What is your interest in the land conflict between your village and MGR?

- a) Protection of livelihood ()
- b) Benefit sharing ()
- C) Extraction of resources ()
- d) Protecting wildlife/ Conservation ()
- e) Others (specify)

35) What do you think should be done to reduce these existing land use conflict between your village and MGR?

.....

Thank you very much for your time and cooperation.

Appendix 2: Checklist for focus group discussion

1. What are the drivers of the land conflict facing MGR and local community?
2. What do you think is the most significant driver?
3. When did conflict started?
4. Is your village registered? If yes when? If not, why not?
5. Do you know the boundaries of your village? How was the boundary established?
6. Do you know the boundaries of MGR? How were the boundaries of the game reserve defined?
7. What is the actual number of cases average you face in the year? Did you report them? If Yes where? If not, what actions did you take?
8. How would you describe the current situation regarding the conflict?
9. What is/are your interests on the land conflict?
10. What is/are your options on the land conflict?
11. a) What are current conflict resolution strategies?
b) Who were involved during conflict resolution?
c) How is the effectiveness of the resolution strategies?
12. Which land dispute resolution system would you prefer to use when you have any land dispute?
13. What are the impacts of conflicts on the livelihood of local communities?
14. What would you like to be done? What would you like to be changed?
15. Is there anything you would like to add and that we have not discussed yet?

Thank you very much for your time and cooperation.

Appendix 3: Checklist for village government officer

1. What are the reasons for the conflicts between Mkungunero game reserve and local community?
2. How people access land in the village? What is the process?
3. What is the current rate of migration in the village? a) High () b) moderate () c) low ()
4. Do you know the boundaries of the game reserve? a) Yes () b) No ()
5. How were the boundaries of the game reserve established?
6. As a village government what is/are your interests on the land conflict?
7. As a village government what is/are your options on the land conflict?
8. a) What are current conflict resolution strategies?
 b) Who were involved during conflict resolution?
 c) How is the effectiveness of the resolution strategies?
9. What are the impacts of conflicts on the livelihood of local communities?
10. What would you like to be done to resolve these conflicts?
13. Is there anything you would like to add that we have not discussed yet?

Thank you very much for your time and cooperation.

Appendix 4: Checklist for Simanjiro district land officer

1. What are the causes of land conflict between local community and Mkungunero Game Reserve?
2. Between Local community and Mkungunero game reserve who has the right over the area their contesting?
3. How can anyone have access to land in the district of Simanjiro?
4. What is the process?
5. Are all allocated rights registered? If yes, how? If no, why not?
6. What can you tell me about the establishment of MGR and the rights of local villagers? Were rights of local people extinguished?
7. Do you know the boundaries of MGR?
8. What is/are your interests on the land use conflict?
9. What is/are your options on the land use conflict?
12. Is the district land office involved in conflict resolution between local community and Mkungunero Game Reserve? If yes how? If no, why not?
13. What were the biggest challenges people faced during this land conflict?
14. Is there anything you consider relevant for my research and that you would like to add?

Thank you very much for your time and cooperation.

Appendix 5: Checklist for Mkungunero game reserve officers

1. What are the drivers of the land conflict between MGR and local community?
2. What do you think is the most significant driver? When did conflict started?
3. Were the area declared as a game reserve registered? When?
4. How was the boundary of MGR established?
5. Can you explain the interests of the Mkungunero Game Reserve in the land conflict?
6. How could you say about the land conflicts cases you face in this year?
7. What is the actual number of cases you face in the year? What actions did you take?
8. Did conflict affect tourism activities in the area? How?
9. What was/were the impacts of conflict to workers?
10. What are the conflict resolution strategies?
11. What conflict resolution strategies was/were more effective?
12. How would you describe the status of the boundary of the Reserve?
13. How long did it take or has it taken to go through the resolution process?
14. How much has it cost you to get the conflict resolved?
15. What kind of assistance was required during the conflict?
16. Was assistance received sufficient?
17. How would you describe the current situation regarding the conflict?
18. Will there be any further action taken by your office?
19. What kind of assistance is needed from all different stakeholders to resolve this conflict?
20. Is there anything you consider relevant for my research and that you would like to add?

Thank you very much for your time and cooperation.