LAND USE AND SOCIO-ECONOMIC IMPLICATIONS OF PASTORALISTS IN-MIGRATION IN RUFIJI DISTRICT, TANZANIA

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A THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY OF SOKOINE UNIVERSITY OF AGRICULTURE. MOROGORO, TANZANIA.

2016

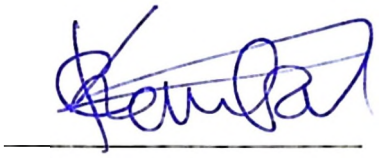
EXTENDED ABSTRACT

The study on which this thesis is based intended to fill the gap on inadequate research regarding the effects of pastoralists' in-migration on land use and socio-economic effects in Rufiji District by: (i) examining pastoralists' influences of land use changes, (ii) examining consequences of pastoralists in-migration on socio-economic activities among local people, (iii) scrutinizing land use conflict escalations, and (iv) examining effects on livelihoods. Data were collected through a survey covering a sample of 200 respondents, documentary review, key informant interviews and focus group discussions. Statistical Package for Social Sciences and Microsoft Excel were used to analyse quantitative data. Qualitative data were transcribed into text and analysed basing on the content and meaning of the text. Binary logistic regression analysis was applied to: establish influence of various factors on land use changes and local people's participation in new economic activities. Multiple linear regression analysis determined the pastoralists' effects on livelihood outcomes. The findings showed that significant factors for the land use change are: number of livestock ($p \leq 0.01$), pastoralists' years in the area ($p \leq 0.05$) and local people's engagement in livestock keeping ($p \leq 0.05$). Four factors influenced local peoples' engagement in new economic activities significantly: age ($p \leq 0.01$), religion ($p \leq 0.001$), education ($p \leq 0.05$) and sex ($p \leq 0.05$). Land use conflicts had been escalating and the actors involved in conflicts had increased. The multiple linear regression analysis results showed that four factors were statistically significant in affecting the livelihood outcomes: new economic activities ($p \leq 0.05$), investors ($p \leq 0.05$), new agricultural systems ($p \leq 0.001$) and land use changes ($p \leq 0.05$). It was concluded that pastoralists are still in-migrating into Rufiji District, thus, land use change is inevitable. The in-migration has both negative and positive livelihood effects. It is recommended that, firstly, there is a need for inter-sectoral working teams. Secondly, strengthening the positive effects and

addressing the negative ones should be done. Thirdly, the local government authorities should ensure that areas for agriculture and for pastoral activities are defined by developing sustainable village land use plans. Fourthly, observing Village Land Act during land allocation should always be done. Fifthly, developing appropriate pastoralists resettling mechanisms and strengthening participatory techniques for conflicts resolution should be done.

DECLARATION

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



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ACKNOWLEDGEMENTS

I am sincerely grateful to the Almighty God who kept me and my family in good health throughout my study period. This study was made possible through the financial support from DAAD (German Academic Exchange Service) and my employer Moshi Co-operative University (MoCU). I also wish to express my appreciation to my employer for granting me a study leave which enabled me to concentrate on and complete the PhD programme of study.

My special and heartfelt thanks go to my supervisors, Prof. Ole-Meiludie, R.E.L (R.I.P) and Prof. Mahonge, C.P. of the Department of Policy Planning and Management in the College of Social Sciences and Humanities (CSSH), from Sokoine University of Agriculture (SUA), for kindly accepting me to be their student and the professional guidance they gave me at different stages of my study. They provided me with very constructive comments which helped me shape this thesis. I acknowledge them for their endless support, cooperation and intuitive guidance which led me to complete this study in the time that was scheduled. I also extend thanks to all academic staff from the Department of Development Studies of the CSSH and to my fellow PhD candidate and fellow staff from MoCU Dr. Gervas Machimu for his cooperation and encouragement during the entire study period.

Many thanks are presented to the Ward Executive Officers of Mbwara, Ikwiriri, Chumbi and Muhoro wards. They are also extended to extension officers and village chairpersons (Nyamwage, Muyuyu, Chumbi A, Muhoro and Kiwanga villages) for their cooperation. Also, thanks are due to villagers for their hospitality, kindness and time devotion to answering my questions. My appreciation also goes to enumerators, Mr. Daudi Kalinga, Mr. Edgar Mbele, Mr. Robert Mbuji, Mr. Rashid Singano and Mr. Kasim Ngulangwa.

I am most grateful and indebted to my lovely wife Etropia Ndowo for her moral support and for being patient with tireless encouragement during my studies. I am also thankful to our children Frank Cyril Kalembana and Ryan Cyril Kalembana for their patience and tolerance during my absence. May the Almighty God bless my family.

I finally would like to express my sincerely thanks to my beloved mother Marcella Theresa Chikelea Komba, my grandparents Martin Chikelea Komba and Catherine Daniel Kanjika for laying down the foundation of my education. May the Almighty God bless you.

DECLARATION

I, Cyril Kalembana Komba, do hereby declare to the Senate of Sokoine University of Agriculture that the publishable manuscripts that make this thesis summarize my independent efforts. This is my own original work and will not be part of another thesis in the publishable manuscript format in any other university.

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LIST OF ABBREVIATIONS AND ACRONYMS

CBOs	-	Community Based Organizations
CSOs	-	Civil Society Organizations
DALDO	-	District Agricultural and Livestock Development Officer
DSI	-	Development Studies Institute
EIU	-	Economic Intelligence Unit
FAO	-	Food and Agriculture Organization
FGDs	-	Focus Group Discussions
FYDPs	-	Five Year Development Plans
GDP	-	Gross Domestic Product
MDGs	-	Millennium Development Goals
MoCU	-	Moshi Co-operative University
NGOs	-	Non-Governmental Organizations
NSGRAP	-	National Strategy for Growth and Reduction of Poverty
PINGOs	-	Pastoralists Indigenous Non-Governmental Organisations
RCO	-	Regional Commissioner's Office
RUBADA	-	Rufiji Basin Development Authority
SDGs	-	Sustainable Development Goals
SPSS	-	Statistical Package for Social Sciences
SUA	-	Sokoine University of Agriculture
THDR	-	Tanzania Human Development Report
URT	-	United Republic of Tanzania

CHAPTER ONE

1.0 Introduction

1.1 Background to the Problem

Tanzania is endowed with a wide range of natural resources for considerable socio-economic potentials. These include extensive areas of arable land, wildlife, natural vegetation, rangelands, coastal and marine resources. Other resources are river systems, lakes and groundwater aquifers (Haule, 2015). However, recent researches have indicated that fast population growth as well as rapidly changing socio-economic environment, coupled with limited management capacities in use of resources, is already creating enormous pressure on the resources including land.

The country has a land policy with the overall objective of promoting and ensuring a secure land tenure system that encourages optimal use of land resources and facilitate broad-based social and economic development without upsetting or endangering the ecological balance of the environment. The land policy specific objectives relevant to pastoralists are: equitable distribution of and access to land, by all citizens; and ensure customary rights on land, especially of smallholders (herdsmen and peasants) are recognized, are clarified and secured in the law (URT, 1997). The policy is very emphatic on equitable distribution of and access to land. Access to land here is interpreted to mean land and resources therein. It is also supportive of participatory land use planning to control growing social and land use conflicts, and meet environmental concerns due to haphazard alienation of rangelands for large scale agriculture (URT, 1997).

Pastoralism is an economic activity involving the care of herds of domesticated livestock. Agro-pastoralism is the practice of agriculture that integrates growing of crops and the raising of livestock. Pastoralists derive more than 50% of their income from livestock and

livestock products, while agro-pastoralists derive less than 50% from livestock and livestock products, and most of their remaining income from crop production (Koocheki and Gliessman, 2005). This study used the term pastoralism meaning also agro-pastoralism because both are found impacting the land use and the socio-economic situation of the local people in the study area.

Pastoralism is an important land use system in East Africa, with pastoralists being found in all the countries of the region, contributing substantially to national economies and providing subsistence to the majority of rural populations (EIU, 2006) including the Lake Victoria basin (FAO/GEF, 2007). Pastoralism is a way of livestock production in which livestock keepers move their cattle, sheep and goats from place to place to take advantage of pastures and water which are available at different times during the year in those different places. On the dry-land plains of Tanzania, livestock and their herders, sometimes entire families, can move large distances to reach suitable pastures, which causes some pastoralists to live nomadic or semi-nomadic life styles (Sendalo, 2009). According to Porokwa *et al.* (2007), among the problems which are shared by pastoralists all over Tanzania and including those during colonial times is that which relates to land alienation.

Tanzania, like many other developing countries, depends heavily on use of land resources for its economic development including activities like pastoralism and agriculture (crop production), with agriculture being the major economic activity as it employs a large percentage of the national population (Yanda, 2005). According to the Tanzania Human Development Report-2011 (URT, 2011), the sector provided 76.5% share in the country and contributed 24.1% of the GDP in 2010. However, land problems are currently becoming more pronounced as population increases, thus demanding more land to sustain the increased need for both food and income.

The Tanzania Land, Agricultural and Livestock Policies realize limitations around the development of the livestock sector; the constraints outlined in the policy take into account restricted access to land, water and pasture resources to pastoralists (Porokwa *et al*., 2007). This is attributed to a land tenure system lacking proper arrangement to allocate land and give ownership of grazing areas in accordance with traditional and legal procedures as outlined in the land policies and laws. In addition, the problem of inadequate grazing resources is amplified by frequent change of pastoral land into cultivation and game reserves (URT, 2006; Mattee and Shem, 2006).

Land use is defined as a purposeful intended use of land, for example commercial uses, forestry, settlement, crop production, to mention a few. It refers to two aspects of habitat condition, namely the patterns of actual use of land (immediate activities that change habitat conditions) as well as the ecological consequences of these activities to both fauna and flora (Primack, 1993, cited by Mughatha, 2002). It has also been defined as "the arrangements, activities and inputs people undertake in a certain land area to produce, change or maintain it. It involves the management and modification of natural environment or wilderness into built environment such as fields, pastures, and settlements (FAO, 2010).

Lack of clear pastoralism policy contributes to the conflicts and violence in different parts of Tanzania. For example, Walsh (2012) documented that in 2006 more than 200 000 cattle with their herdsmen were evicted by government from Usangu and moved to Songea, Kilwa, Rufiji, Lindi, Chunya, Rukwa, and Mafinga. These settlement changes may have environmental, political, institutional, economic and cultural consequences.
Since the beginning of 2002 to date, Rufiji District is experiencing a number of pastoralists from different areas in Tanzania. It is estimated in 2002 that the district had

about 5000 herds of indigenous cattle, mainly 4000 cattle from in-migrating pastoralists, 300 dairy cattle, 7000 goats, 1000 layer chickens and 400 000 local chickens (Mwilawa, 2003). Furthermore, in March 2006, the government of Tanzania, through the Office of the Vice President, issued a statement declaring the eviction of pastoralists, agro-pastoralists and small scale holding farmers from Mbarali and Kilombero Districts in Tanzania (Mvulla and Kawawa, 2006).

The government decision was meant to conserve Usangu-Ihefu Wetland as pastoralists and agro-pastoralists were for many years termed as the critical causes of environmental degradation in the areas. These pastoralists were directed to other regions for settlement and pastoral activities and cultivation of food crops. Among the areas that received the migrant pastoralists were Kilwa, Lindi Rural, Bagamoyo, Rufiji, and Kisarawe Districts. There is no doubt that the in-migrant pastoralists must have had some land use and socio-economic effects on the destiny environment and to the local people.

This study aimed at, among others, scrutinising the land resources use and socio-economic effects caused by the in-migrant pastoralists' in Rufiji District to the local people. The study specifically analyzed consequences on land use changes as a result of pastoralists' in-migration in the district; socio-economic consequences among local communities which resulted from the coming of the pastoralists; land use conflicts escalations and linking the pastoralists' arrival in the district and its effects to the local people in terms of changes in the their livelihood.

1.2 Statement of the Problem

Migration (voluntary or forced) has been an important force in bringing social, economic, environmental and political changes to the destination areas. For example, a study by

Chilivumbo (1985) cited by Mbonile and Mwamfupe (1997) indicates that the process of migration has been an important force in bringing about social change in rural areas, especially in transformation of peasant agriculture. The in-migrants are said to bring consequences in various areas as far as their settlement, leading to increased pressure on land and its related resources such as water and forests.

Since 2001, many pastoralists and agro-pastoralists have moved to Rufiji from Mbeya, Iringa, Kilombero, Kisarawe and Kibaha. It has been estimated that, by December 2002, a total of over 4000 cattle had arrived in the district (DALDO's Report February, 2002). It was estimated that, at the rate pastoralists were entering Rufiji District ten times this number of cattle had arrived before the end of 2003.

Pastoralists' activities in Rufiji District were, to some extent, newly introduced socio-economic activities. Traditionally a limited number of residents were engaged in livestock keeping. The district had no traditional pastoralists, and the inhabitants of this area traditionally are not livestock keepers. In the recent years, there has been in-migration of pastoralists and agro-pastoralists with their large numbers of cattle from other places in search for pastures and water. In 2006, the movement of pastoralists to Rufiji District was fuelled by the government's decision to evict pastoralists who resided in Usangu-Ihefu wetlands and Kilombero District.

Detailed studies on land use change in many parts of the world have been conducted for example by scholars like Lambin *et al.* (2000) and Ali (2004). Lack of sufficient environmental educators and the people's awareness was reported by Klooster (2002), while inappropriate government's policies were studied by Anderson and Gibson (2007). Studies conducted on pastoralism and pastoralists' migration have been concentrating on

the causes and their socio-economic effects. PINGOs (2007), Walsh (2012) Maswaga (2013), Ngailo (2011) and Msomba *et al.* (2016) specifically focused on the 2000s move of pastoralists to the Coast Region, Lindi, Songea and Chunya. They did little on the land use consequences of the pastoralists' influx. This marks a very scanty documentation of adverse impacts of in-migrant pastoralists to Rufiji District.

The studies by PINGOs (2007), Walsh (2012) Maswaga (2013), and Ngailo (2011), Mvulla and Kawawa (2006) and Porokwa *et al.* (2007) showed that there is limited empirical evidence on the pastoralists' in-migration in relation to land use and socio-economic effects among the local people in Rufiji District. Therefore, this marked a knowledge gap along this area. This study focused on the land use and socio-economic implications of the pastoralists' in-migrants in Rufiji district. This is due to the fact that the in-migrating pastoralists into the area are certainly not without repercussions and influence on land uses and socio-economic issues.

1.3 Justification for the Study

The study was conducted to provide a new dimension to land use change and socio-economic dynamics in Rufiji District to understand how land was used in the past, what changes have occurred and what have emerged as a result of the influences from the pastoralists. The study has produced important information about the effect of pastoralists' in-migration on land use changes and on socio-economic status of the study area. This analysis is of great use to sustainable land use and land resource management, and socio-economic development planners, as it provides empirical information related to land use and socio-economic activities effects.

Previous studies (PINGOs, 2007: Walsh, 2012; Ngailo, 2011) have explained pastoralists' migration and its interrelationship with environment and socio-economic consequences in Mbarali, Ihefu, Kilosa and generally elsewhere in Tanzania. However, there was lack of research on land use and socio-economic effects of the pastoralists' in-migration in the study area, more specifically among the local people. PINGOs (2007); in collaboration with HAKIARDHI, Legal and Human Rights Centre (LHRC), and HIMWA; did a study on the Usangu-Ihefu evicted migrants. Their main focus was on the processes used and the effects of human rights violations, which resulted from the eviction process from Mbarali to Kilwa and Lindi Rural Districts. Ngailo (2011) assessed the effects of eviction on household food security of livestock keepers from the Usangu wetland in South West Tanzania to Kilwa District.

This study investigated the possible related socio-economic and land use implications and consequences which emerged as a result of the pastoralists' in-migration to the district. The study was in line with the Millennium Development Goal (MDGs) Number 7 which aimed at ensuring environmental sustainability through reversing the loss of environmental resources (UN, 2006) and the succeeding Sustainable Development Goal (SDGs) Number 15 which emphasises on protecting, restoring and promoting sustainable use of terrestrial ecosystems, sustainably managing forests, combating desertification, and halt and reverse land degradation and halt biodiversity loss. The study is also in line with targets number 5 and 6 of the SDG, Number 15 whereby both targets call attention to take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and ensure fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources respectively (UN, 2015).

Furthermore, the study addresses the National Land Policy of 1997 whose overall objective is to promote and ensure a secure land tenure system that encourages optimal use of land resources and facilitates broad based social and economic developments without upsetting or endangering the ecological balance of the environment. The study adds significant empirical information on the decision made in the study area as well as elsewhere where pastoralists were directed to go.

It is expected that the findings provide information for decision makers and development practitioners about the magnitude and dimensions of land use changes, land use conflicts, socio-economic and livelihood consequences and community mitigating strategies in the study areas in relation to pastoralists' migrations. This is critical for formulating effective policies and management strategies.

1.4 Objectives

1.4.1 Overall objective

The overall objective of the research was to examine the implications to land use changes and socio-economic consequences of pastoralists' in-migration in Rufiji District.

1.4.2 Specific objectives

The specific objectives of the research were:

i. To examine the influence of pastoralists' in-migration on land use changes,

ii. To examine socio-economic consequences of pastoralists' in-migration among the local people,

iii. To scrutinize and characterize land use conflict escalation as a result of pastoralists' in-migration, and

iv. To establish a link between pastoralists' arrival and effects on people's livelihood outcomes.

1.5 Research Questions and Hypotheses

This study applied a mixed methods approach whereby both qualitative and quantitative techniques of gathering and analyzing data were used. It was therefore imperative to use both research questions and hypotheses. Research questions were mainly used in guiding the qualitative approach whereas hypotheses were applied in inferential analysis.

1.5.1 Research questions

The study was guided by the following research questions:

i. How are land use changes of pastoralists' in-migration emerging in the area?

ii. What are the socio-economic consequences of pastoralists' among the local people?

iii. To what extent have the land use conflicts escalated as a result of pastoralists' in-migration in the study area?

iv. How the arrival of pastoralists' is linked to the local people's livelihood outcomes attainments?

1.5.2 Null hypotheses

The study was guided by the following null hypotheses:

i. Pastoralists' arrival in Rufiji District has no effects on land uses.

ii. Pastoralists' arrival in Rufiji District has no influence on socio-economic activities of the local people.

iii. Pastoralists' arrival in Rufiji District has no significant impact on the livelihood outcomes attainments among the local people.

1.6 The Conceptual Framework

The study determined the land use and socio-economic changes and consequences of pastoralists' in-migration in the destination areas (the case of Rufiji District). This conceptual framework explains pastoralists' in-migration which may lead to increased demand for land as well as introduction of new socio-economic activities. Pastoralism and other socio-economic activities undertaken by pastoralists in the destination areas are treated as independent variables which influence and are regarded to be drivers of land use and socio-economic changes which have occurred and are expected to occur, and these are treated as dependent variables. For example, the process of migrating implies there is a need for the migrant to secure a place for settlement and other productive activities. As far as population increase is concerned, it is expected that the activities carried out by the in-migrants and the local communities can lead to pressure on land and other potential resources available and their interactions may lead to land use consequences (land use changes, changes on structure, and land condition changes) and socio-economic effects among the local communities (income, culture and land use conflicts).

It was assumed that there is a link between pastoralists' socio-economic activities and land and socio-economic status of the local people (receiving communities). In this case, pastoralists have a significant role in influencing land use status and socio-economic activities in the settled areas. It presumes that pastoralists serve as agents for the existing land use changes in the local areas and socio-economic effects among the local people. The specific case for this study is that pastoralists in the district have led to the population pressure on the land and introduction of new socio-economic activities and interacted with local communities with a very high interest, especially of pastoralism activities and also the socio-economic dependence of the local communities whereas most of them are small scale farmers as well as fishermen. Through the migration processes, there are possibilities

of population increase in the destination areas and hence jeopardizing the existing land uses, through the introduction of previously non-existent socio-economic activities, and new land management techniques like land cultivation methods (Fig. 1.1)

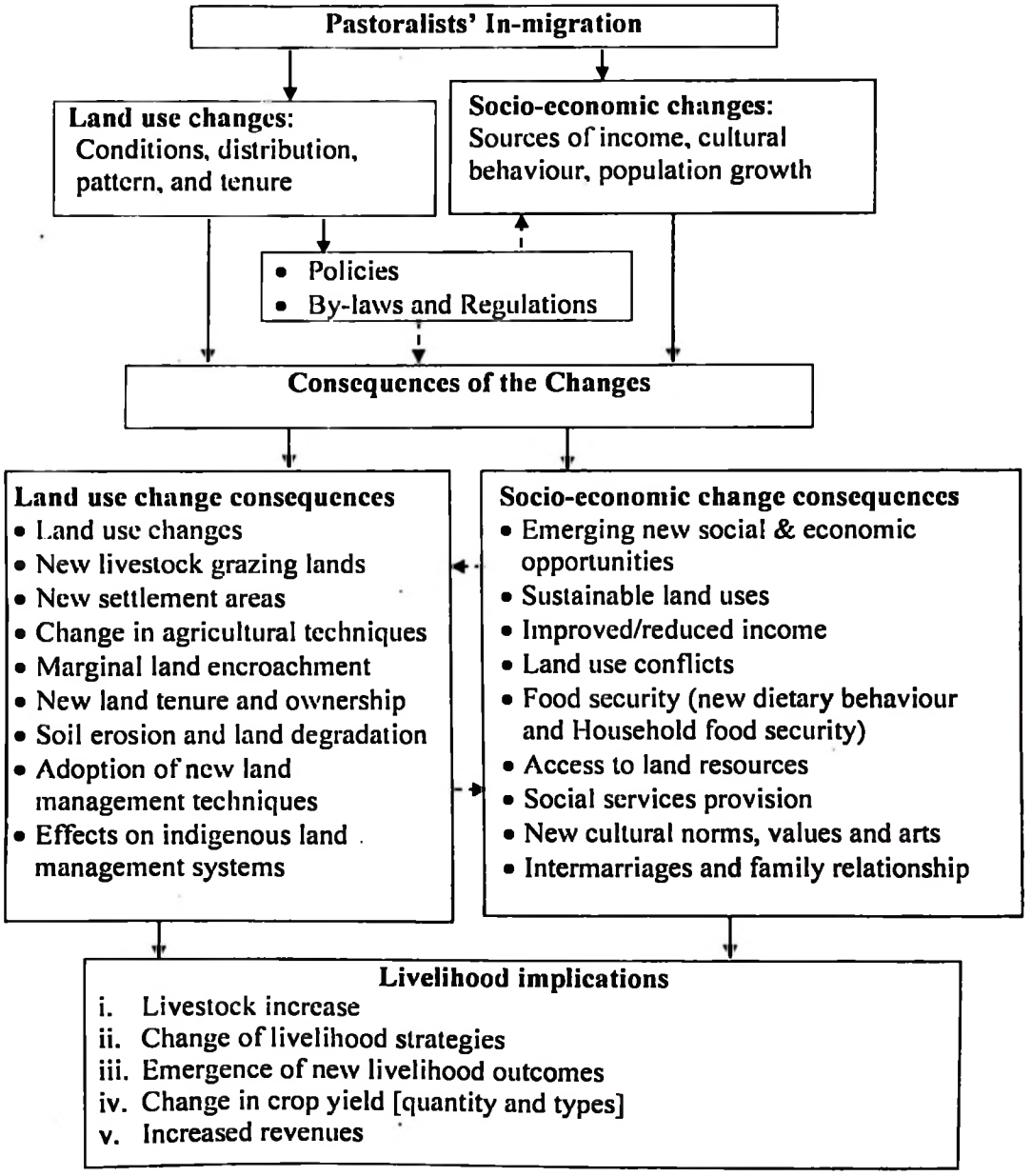

Figure 1.1: The conceptual framework of the study

Key: Action line ⟶ Influence line - - ▸

1.7 Theoretical Review

There are several studies under migration and population theories by different scholars. Most of the studies tend to concentrate on the economic factors of migration, rural-urban migration directions and international migration, but they do not touch on migration related consequences, more specifically on land use changes and socio-economic consequences of the destination areas. Pastoralists' migration has been neglected, and many scholars do not determine the role of pastoralism in relation to land use change and socio-economic changes of the receiving communities. Three manuscripts of this study were guided by three theories which were developed by different scholars who meant to explain issues concerning migration and social interaction.

Basing on the nature of the study (variations nature of the specific objectives), it was necessary to use the three different theories so as to suit the study. The reasons for use of each theory in each respective manuscript have been provided accordingly in each manuscript. The Malthus' Population Theory (1978) has been used to guide the manuscript number one in chapter two which is describing specific objective number one. The Social Conflict Theory as developed by Dahrendorf (1959) and Simmel (1969) and Aubert (1963) was used to guide the manuscript number three which was based on the specific objective number three of the research of which this thesis is based. Finally, the objective number four of this study which has been described in manuscript number four in chapter five of this thesis was guided by the Migration Ideology by Esther Boserup (1965).

1.7.1 Malthus' population theory

The Malthus' Population Theory explains issues on population increase in a given area. Thomas Malthus in 1798 published a book called: *An Essay on the Principle of*

Population. In his arguments, Malthus explained that during that time population was growing at a rate that exceeded available supply and the ability of the natural resources to support the growing population. The theory postulates the dangers of population growth and over population on the natural resources. He argued that human populations would increase at a faster rate (geometric) than that of food supply which would increase at an arithmetic rate. A point would come when human population growth would reach the limit at which food resources could support it. But the contemporary followers of Malthus, like Ehrlich and Ehrlich (1990), argue that the impacts on the environment is a function of population size, level of affluence, economic activities and technology, but the weakness of this argument is that it does not talk specifically of the land use and socio-economic changes and consequences to the destination areas as caused by population increase resulting from migration. As the theory postulating the environmental effects of population increase, it was therefore significant to be considered in this study on pastoralists migration for migration is considered one of the aspects of the population changes in terms of population structure and composition.

1.7.2 Social conflicts model

Social theorists in the nineteenth and early twentieth centuries were concerned with conflict in society. Conflict theorists do not believe that societies smoothly evolve to higher levels. Instead, they believe that conflicting groups struggle to ensure progress (Coser, 1957). Conflict theorists assert that conflict is a necessary condition for change. It must be the cause of change. Thus, conflict is associated with all types of social change in one way or another. The current study was based on three social conflicts model ideas by Dahrendorf (1959), Simmel (1969) and Aubert (1963). According to Dahrendorf (1959), conflicts are a struggle between social groups and also are a result of clashes of group interests. On the side of Simmel (1969), conflict is merely an intense form of social

interactions and is a normal part of the social order. On the other hand, Aubert (1963) classified the types of interpersonal conflict that arise in dyadic relationship between two individual groups. the sources of the conflicts and the ways of resolving the conflicts. The social conflict model basing on the above mentioned scholars' ideas was necessary for they all dialogue on the existence of conflicts in societies; they mention about causes, mediation techniques as well as classifying the conflicting actors. The model ideas are thus relevant for this study.

1.7.3 The Boserup migration theory

Esther Boserup (1965) regards migration as one of the determinants of population growth of any society. She argues that intensification is an induced response to population growth. She maintained that production was intensified and additional technology adopted mainly when forced by population. She argues further that increased population pressure provides the primary stimulus for innovation and intensification. Changing agricultural methods to raise production concentration at the cost of more work at lower efficiency is what Boserup describes as agricultural intensification. The model is over simplified, but it provides invaluable starting points from which to address the complexities of agricultural change. Rather than technological change determining population (via food supply), in this model population is determined by technological change. There is discrepancy in the Boserup's theory that it bases only on the innovations in agriculture. It does not consider some other factors that may change as a result of population growth. The study takes the idea from Boserup as such that migration in the study area has caused population growth directly (in-migrant pastoralists themselves) and indirectly (other groups of people coming in the area for other purposes apart from pastoralism, including investors). In this case the increased population in the area is assumed to have caused effects on the local people's livelihoods.

1.8 General Methodology

In this sub-section, study location, research design, sampling procedures tools and methods of data collection and analysis are presented and discussed.

1.8.1 Description of the study area

The study was conducted in Rufiji District which is among six districts in the Coast Region. The district is located at about $7^{0}30'$S to $8^{0}50'$S and $39^{0}40'$E to $39^{0}50'$E along the East coast of Tanzania, and the headquarters of the district are at Utete. The district covers an area of about 13 339 km^2 out of which 4824 km^2 are deemed suitable for crop and livestock production. Rufiji District is bordered to the North by the Kisarawe and Mkuranga Districts, to the East by the Indian Ocean, to the South by the Lindi Region and to the West by the Morogoro Region. The Rufiji River runs through the district and forms the biggest river plain in the country. The total human population of the district, basing on the 2012 population and housing census, is 217 274 (URT, 2013).

The district was chosen because it had been receiving a number of pastoralists since 2000s and is among the areas identified by the government where the Mbarali and Kilombero evicted pastoralists were directed to go (Mvulla and Kawawa, 2006). Traditionally, the Rufiji inhabitants acquire their animal protein needs from fishing, hunting and poultry-keeping. The main economic activities include small-scale farming, wood harvesting (large forests of mangrove) and non-wood products and crafts. Fishing is the second major economic activity in Rufiji District (Mbiha *et al.*, 2001). The major means of survival among the natives in the district include crop cultivation, fishing, forest product, livestock keeping (mainly poultry) and petty business (Mwilawa, 2003). The study was conducted in five sampled villages, namely Muyuyu village, Kiwanga village, Muhoro village, Nyamwage village and Chumbi A village (Fig. 1.2).

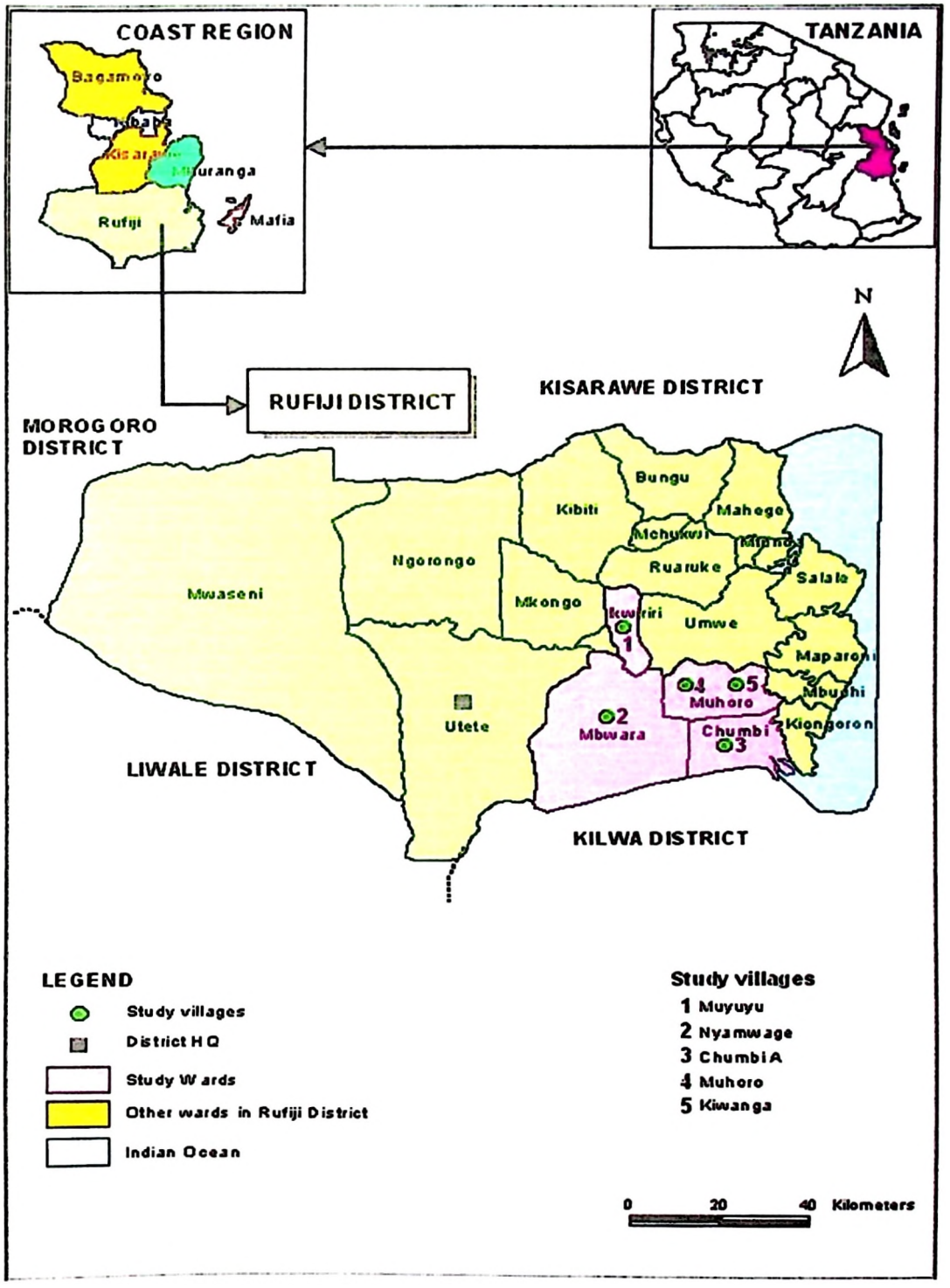

Figure 1.2: Maps showing the study villages

1.8.2 Research design

The study applied the cross-sectional research design. This design allowed data to be collected at one point in time and was suitable for descriptive analysis as well as for determination of relationships among variables (Bailey, 1994). In a cross-sectional study respondents are interviewed at a single point in time (Mann, 2003) which serves money and time. The design was suitable for the study because the collection of data was done once, which made the study cost and time effective. This involved the investigation of the relationship existing between the pastoralists' socio-economic activities and the emerged land use and socio-economic effects in the study area. The design was proposed due to its flexibility characteristics in the collection of both qualitative and quantitative information with great accuracy, quick and precise results at a reasonable period of time.

1.8.3 Sampling procedures

The study used multistage stage sampling techniques to select the divisions, wards and villages in the study area. This method allows more than one sampling method to be used (Kothari, 2004). In this case, both probability and non-probability sampling methods were applied, and the units of analysis for the study was a household member, whereby all members of the households aged above 30 years had equal chances of being interviewed. The respondents for the study included village members from each household who were aged 30 years and above in 2014 and who had been living in the village since or before 2000. This was done purposefully due to the fact that demographically all of these by the year 2000 were ageing 13 years and above and hence they had experienced the situation under investigation.

Purposeful sampling was applied to pick Rufiji District among the other districts. This is because Rufiji District had experienced invasion of pastoralists in 2000s and also is among

the districts where the 2006 evicted pastoralists were directed to move for settlement. The records show that Rufiji had received a large number of cattle (18 000) compared to Kilwa (8 000 cattle). Bagamoyo (4 958) and Lindi Rural (4 000) while Kisarawe was not among the districts in the coast region which received the immigrant pastoralists because it was not prepared to host the pastoralists and pastoralists who were required to move into the district were directed to Bagamoyo district (Mvulla and Kawawa, 2006). Rufiji District also had different socio-economic characteristics (small scale farming and fishing activities) before the arrival of pastoralists, but it had limited experience of pastoralists' activities as compared to Bagamoyo which had experienced in-migrant pastoralists since before.

According to the Coast Regional Commissioner's Office information, Rufiji District had about forty four three hundred forty two thousand (44 342) households. Basing on Cochran formula (1977), a total number of 396 households of both the pastoralists and the host communities were sampled for the interview. The sample was reduced to 200 households which included the host communities' households only, due to minimum socio-economic and cultural homogeneity differences among host communities in the study area and basing on argument by Bailey (1994) that a sample of 30 respondents is the bare minimum for studies in which statistical analysis can be done regardless of the population size. Forty (40) respondents from 40 households were selected from each of the 5 villages which made a total of 200 respondents. Cochran's formula based on the level of precision, degree of confidence and variability of the population is presented as follows:

$n = N/(1+N)(e)^2$ 1

Where: n = sample size

N = population size (44 342)

e = Level of precision or Sampling Error. Estimated in percentages (5%) = 0.05According to the information from the office of the Coast Regional Commissioner. Rufiji district had 44342 households. Therefore, the sample size was calculated as:

$n = 44342/ (1 + 44342) (0.05)^2$

$n = 44342/ 1+ 110.855$

$n = 44342/111.855$

$n = 396$

Purposeful sampling was also used to identify officials for key informant interviews; this included District Agricultural and Livestock Development Officer (DALDO), District Land Officer, Village Executive Officers and Extension Officers. The k^{th} element was applied to pick the sampled villages. To get the first village, the sampling fraction was used; other villages were selected basing on the 4^{th} village which the fraction obtained. The villages (20) which had received pastoralists were subjected to the formula. Five (25%) out of 20 villages were selected. The sampling fraction used to obtain the sampled villages is presented as follows:

$K=N/n$.....2

K= Sampling Fraction

N= Total number of villages

n= Sample size

1.8.4 Types and sources of data

The study involved the collection of both qualitative and quantitative data. It was necessary to use a combination of data in order to obtain sufficient and insightful information for this study. In this case, therefore, both qualitative and quantitative techniques were applied in the process of collecting the primary data. The primary data collected included the trends of the land use conditions, land use distributions, and

respondents' socio-demographic data (age, sex, religion, occupation, level of education, and household size). Other primary data included peoples' involvement in new economic activities, the livelihood outcomes attained, socio-economic challenges encountered after the pastoralists' arrival and the newly introduced socio-economic activities. Sources of primary data included the key informants, household heads and community members.

On the other hand, secondary data collection was done through documentary review and review of reports from village and district authorities. It also included review of research reports related to pastoralists' migration. This involved reviewing the existing information especially on population composition, village land use distributions, pastoralists and livestock arrival reports from each village, number of registered pastoralists, registered number and types of received livestock, historical events of land use conflicts occurred in the study area as well as the number of pastoralists allocated to each village.

1.8.5 Methods and tools for data collection

A household survey was used: it sought to capture information regarding people's understanding and identification of land use changes as well as interrelated drivers and effects and the socio-economic effects of the pastoralists' in-migration in the study area. A total of 200 respondents were involved in the household survey whereby each village was represented by 40 respondents from 40 households. The respondents of every household was someone who was 30 years old and above in 2013-2014 and who had been living in the village since or before 2000. These were selected on the basis that they had experienced the situation under investigation before and after 2000. A questionnaire (Appendix 1) was administered during the household survey.

Participatory rural appraisal using the focus group discussions and key informants interviews, among other techniques, were also conducted. A total number of 54 (Table

1.1) participants (local people) with mixtures of socio-demographic characteristics in ten to twelve members were involved in Focus Group Discussions (FGD). This number of FGD participants was based on the arguments by Wong (2008) that an FGD should consist of between six and 12 people. The author further argues that the group should not be so large as to preclude adequate participation by most members nor should it be so small that it fails to provide significantly greater coverage than that of an individual interviewee.

The FGDs were conducted in each village, and the group formation considered both homogeneity and heterogeneity composition of participants' socio-demographic characteristics. The FGD conducted enabled the study to capture a range of experiences and opinions among the community members. An FGD lasted for about forty five minutes, and the participants included elder villagers (both females and males). Key informant interviews were also conducted whereby twelve key informants interviewed. The key informants were selected on the basis of their professions, titles, age and life time spent in a village (elders). The elders were recommended by the village leaders who were consulted. Out of the twelve selected key informants, five were the elders, three village leaders; one retired land officer, one District Land Officer and two were Extension Officers. Each interview lasted up to an average of one hour. Checklists were used to guide FGDs and key informant interviews (Appendices 2, 3 and 4). During the FGDs and interviews responses were captures by being recorded in note books and the respondents' voices were also captured using a voice recorder.

Table 1.1: Socio-demographic characteristics of FGD participants (n=54)

Sn.	Characteristics	Number/percent composition
1	Mean age (years)	41.4
2	Primary education	68.5%
3	Secondary education	20.4%
4	Madrassa	11.1%
5	Christians	44.4%
6	Muslims	55.6%
7	Males	61.1%
8	Females	38.9%
9	On-farm employment	70.4%
10	Off-farm employment	29.6%
11	Married	53.7%
12	Single	46.3%
13	In-migrant resident	42.6%
14	Original resident	57.4%

1.8.6 Data presentation and analysis procedures

Analysis of qualitative data involved quotation of statements, interpretation, identifying variations and similarities of the related arguments. Content analysis was used whereby data were summarised by their themes, and comparing and contrasting arguments given during interviews and discussions. Pictures have been used to demonstrate the real situation in the study area. Quantitative data were coded using Statistical Package for Social Science (SPSS). The coded data were transferred into computer code sheets for processing to determine descriptive statistics such as frequencies and percentages to analyse the quantitative information.

Binary logistic regression was used to test factors influencing land use changes. The dependent variable (Y) attempted to explain whether there were land use changes or otherwise. No land use change was assigned a value of 0, and presence of land use change was assigned a value of 1. The model was presented as follows:

$$\text{Logit}(pi) = \log(pi/1-pi) = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + \ldots\ldots b_kx_k \ldots\ldots\ldots\ldots\ldots\ldots 3$$

(Agresti, 2002; Powers and Xie, 2000). Where:

Logit (pi) = in odds (event), that is the natural log of the odds of an event occurring, in this research

p_i = prob (event), that is the probability that land use changes will occur

$1-p_i$ = prob (no event), that is the probability that the land use changes will not occur

b_0 = constant of the equation

b_1 to b_k = coefficients of the independent variables (predictors)

k = number of independent variables

x_1 to x_6 : Independent variables for land use changes entered in the model

x_1 : Number of pastoralists received

x_2 : Number of livestock owned by pastoralists

x_3 : Population size of the area

x_4 : Number of years spent by in-migrant pastoralists

x_5 : Number of economic activities introduced in the area

x_6 : Natives' involvement in livestock keeping

The binary logistic regression was also performed to assess the impact of six factors that influenced local people to engage in new socio-economic activities. The dependent variable (Y) attempted to explain whether there was adoption of new activities or otherwise. Not engaging in new activities was assigned the value of 0, and engaging in new economic activities was assigned the value 1. The Wald coefficient of an independent variable, which had higher contribution of the variable to the occurrence of the dependent variable, according to Agresti (2002) and Garson (2008), was also computed. The odds ratio (Exp (B)) to identify the strongest predictor of reporting adoption was also computed. In the analysis of qualitative data there were quotations and interpretations of statements which were all based on the contexts of the given arguments. The implicit form of the binary logistic regression model was presented as follows:

Logit (pi) = log (pi/1-pi) = $b0 + b_1x_1 + b_2x_2 + b_3x_3 + \ldots b_6x_6$.....4

(Agresti, 2002; Powers and Xie, 2000). Where:

Logit (pi) = in (odds (event)), that is the natural log of the odds of an event occurring

p_i= prob (event), is the probability that there is engagement in new economic activities

$1-p_i$ = prob (no event), is the probability that there is no engagement in new economic activities

b_0 = constant of the equation

b_1 to b_k = coefficients of the independent variables (predictors)

k = number of independent variables

X_1 to X_6 : Independent variables for engaging in new economic activities entered

X_1 : Sex of the head of the household (male or female)

X_2 : Age of the household head measured by number of years

X_3 : Religion of affiliation among the household members (Christians only, Muslims only and Christians and Muslims)

X_4 : Education level of the head of the household (number of years in school)

X_5 : Occupation of the head of the household (on-farm and off-farm employment)

X_6 : Household size (number of household members)

The multiple linear regression was used to test the null hypothesis that the arrival of pastoralists in Rufiji District does not have significant impacts on livelihood outcomes among the local people. The model was used to determine the impact (negative and positive) of the independent variables on the natives' livelihood outcomes at both household and community levels. The livelihood outcome was measured by developing a livelihood outcome index. The index assessed whether the local people respondents were able to build modern houses (iron sheet roofed and cement blocks constructed houses), change agricultural production systems and techniques, improve food security, involved in

resource use conflicts, adopted newly introduced cash and food crops, engaged in production of newly introduced livestock, prepare village sustainable land use plans, increase and improve sources of income, improve access to social services, and witnessed an increase in population and growing social interactions. The response weights were yes = 1 and no = 0. Thereafter, each livelihood outcome was assigned points, and all the points were added up to get the overall scores on livelihood outcomes. The overall scores ranged from 0 to 11 attainments as measured using the total number of livelihood outcomes.

Before running linear regression, independent variables and the dependent variable were checked for normality by determining their normal curves, which were then checked visually to find whether they were normally distributed. Checking normality was done because linear regression requires all variables to be normally distributed across the sample. Pallant (2005) emphasizes that any variable that does not have a normal distribution should be transformed into a normal distribution. All the variables were found to be normally distributed; therefore they were not transformed.

All the independent variables were also checked for multicollinearity. Multicollinearity is an undesirable condition whereby two or more pairs of variables have so much linear relationship that inclusion of both variables reduces the quality of the results (Pallant, 2005). Multicollinearity was checked by computing Variance of Inflation Factors (VIFs) and tolerances of independent variables during regression analysis. Mela and Kopalle (2002) explained that the VIF is a more rigorous check for collinearity than the correlation coefficient. The VIF of an explanatory variable measures the inflation of the variance of the variables' regression coefficients relative to a regression where all the explanatory variables are independent. VIFs are inversely related to tolerances with larger values indicating involvement in more severe relationships. According to the rule of thumb, VIFs

above 10 or tolerances below 0.1 are seen as a cause of concern (Landau and Everitt, 2004). All the tolerance values of collinearity which were greater than 0.1 and VIF values of collinearity which were less than 10 show that there was no multicollinearity. The multiple linear regression model used to test the hypothesis was specified as follows:

$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + ...b_8x_8 + e$.....5

Where:

Y= total number of natives' livelihood outcome attainments (continuous variable)

a=Constant or Intercept of the equation

$b_1 ... b_8$ = Regression coefficients.

e = Error term representing a proportion of the variance in the dependent variable that was unexplained by the regression equation.

X_1 = New economic activities. X_2 = Pastoralist number of years. X_3 = Number of received pastoralists. X_4 = Investors. X_5 = New agricultural systems and techniques. X_6 = population change. X_7 = Change in land use. X_8 = Market services. The variables are defined in Table 1.2.

Table 1. 2: Definition of variables used in the model

Variable	Definition	Measurement level
New economic activities	Number of new economic activities practised after the arrival of pastoralists	Interval (number of new economic activities)
Pastoralists number of years	Number of years pastoralists lived in the village	Ratio (Years)
Number of pastoralists	Number of pastoralists received in a village	Interval (number of pastoralists)
Investors	Presence of other investors as attracted by the presence of pastoralists in the area	Nominal Yes = 1, No = 0
Agricultural systems and techniques	Practicing new introduced agricultural systems and techniques	Nominal Yes = 1, No = 0
Population change (increase)	Change on the number of people in a village	Nominal (Yes = 1, No = 0)
Land use changes	New land uses in the area	Nominal (Yes = 1, No = 0)
Market services	Number of livestock auction market centres available	Interval (Number of market centres)

1.9 Reliability and Validity of the Questionnaire

The questionnaire was checked for internal consistency using Cronbach's alpha (α) coefficient. The Cronbach's alpha is used to determine the internal consistence or average correlation of items in a survey instrument or to gauge its reliability. A Cronbach's alpha of 0.740 was obtained indicating an acceptable reliability measure for the questionnaire, considering that 0.70 is the recommended cutoff value for being acceptable. It was also prudent to test both content and face validity. The content was assured by means of a comprehensive literature review while the validity was assured through consultative discussions with senior academics.

1.10 Limitations of the Study

The results of this study are at best related to the land use and socio-economic effects of pastoralists' in-migration in Rufiji District. The study was limited to effects which had been facing the local people (the people who received pastoralists). The study involved respondents (local people) who had been in the village since or before the year 2000.

This study also encountered methodological limitations such as self-reported facts and attribution which, if not addressed, would have affected the validity of the research findings but the study had to rely on information provided by the respondents. In other words, the researcher had to record what people said, whether in interviews or on questionnaires, at face value. However, these data contained potential sources of bias that should be noted as limitations. One limitation was selective memory like remembering or not remembering experiences or events that occurred at some points in the past, such as old sources of income, the t number of pastoralists received, the year when pastoralists started being received as well as the frequently occurring conflicts between the in-migrants and the local people and also tracking the history of land use conflicts. These limitations were minimized through triangulation of data in which information gathered through a questionnaire based survey were verified using interviews and focus group discussions.

1.11 Ethical Considerations

The study involved human beings. In this case, therefore, it was necessary to have permission of the people who were to be involved in the study. An introduction section was created in the questionnaire for the purpose of obtaining informed consent from the respondents. During the interview the researcher used to introduce himself to the respondents and explained to them the purpose and importance of the study. All the respondents were assured of confidentiality of their responses. Katundu *et al.* (2014) explained that in social science research, a code of ethical principles requires researchers to obtain an informed consent from all respondents, protect respondents from harm and discomfort and treat all information with confidentiality.

1.12 Organization of the Thesis

This thesis contains four publishable manuscripts which are presented as chapters. The whole thesis is organised in six chapters and opens up by presenting an introduction as chapter one. This sets background information to the thesis, study objectives, theoretical review and the general study methodology and ethical considerations of the study. Chapter two presents manuscript number one that focuses on the influence of in-migrant pastoralists on land use change. It is followed by chapter three, which presents manuscript two that deals with the influence of in-migrant pastoralists on socio-economic activities of the local people. Chapter four presents manuscript number three, which focuses on the land use conflicts escalation as an aftermath of pastoralists' in-migration. Chapter five, on the other hand, presents the fourth manuscript that deals with the impacts of in-migrant pastoralists on livelihood outcomes of the local people in Rufiji District. In chapter six, the thesis presents a summary of the results and discussion integrating all the manuscripts, conclusions and recommendations. The contribution of the study to the body of knowledge as well as its policy implications are also presented, and finally areas for further studies are also suggested.

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CHAPTER TWO

2.0 The Influence of In-migrant Pastoralists on Land Use Change in Rufiji District, Tanzania

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Target Journal: Journal of Continuing Education and Extension

2.1 Abstract

This study was conducted to determine land use change as a consequence of pastoralists' arrival in Rufiji District. It involved a total of 200 households whereby each was represented by one member. Data collection methods involved: household survey, interviews, focus group discussions and documentary review. Binary logistic regression was applied to establish factors influencing land use changes. The study established that land use had been changing from time to time after the arrival of pastoralists. Before their arrival, land uses were dominated by crop production and human settlement. After their arrival, the land uses became dominated by crop production, human settlement and

livestock keeping, implying that livestock keeping is a new land use practice. Three factors had significant influence on land use change (number of livestock owned by pastoralists ($p \leq 0.01$), number of years pastoralists lived in the area ($p \leq 0.05$) and the local people's involvement in livestock keeping ($p \leq 0.05$). It is concluded that the pastoralists and their associated activities have led to the land use changes in the area. The land use and conditions change feature through water sources destruction, spread of forest fires and vegetation clearance. It is recommended that efforts should be made to minimize adverse effects over the land by making sure those areas for agriculture and pastoral activities are defined and provision of necessary services in the areas is done. The district authorities should develop sustainable land use plans for each village to ensure that land uses are properly planned.

Key words: pastoralists, agro-pastoralists, land use change, Tanzania.

2.2 Introduction

Tanzania is endowed with abundant natural resources including land with an area of about 942 600 square kilometres and a population of about 44 928 923 people in 2012 (URT, 2013). Land is the most important natural resource on which all activities are based and is a platform for all human activities. Therefore, whatever is done in any sector of economy has an impact on land (Fredy *et al.*, 2014). Growth in the livestock population has raised the demand for grazing land (including that under cultivation) and has also made serious soil problems in some areas (URT, 1997). Land use is the term used to describe human uses of the land, or immediate actions of modifying or converting land cover. It includes such categories as human settlements, protected areas and agriculture (Sherbin, 2002). It refers to what people do on the land surface, that is, the manner in which human beings employ the land and its resources (Geist and Lambin, 2002). According to Veldkamp and

Fresco (1996), land use change is determined by special and temporal interaction between biophysical factors (e.g. soil, climate, vegetation and topography) and anthropogenic factors (e.g. population size and density, technology levels, economic conditions, the applied land use strategy, and social attitude and values).

Land use change is among the drivers of environmental change influencing the basic land resources including the soil (Maitima *et al.*, 2010). With the recent advances in satellite remote sensing, software and computer technology, land use and land cover studies have progressed significantly in the last two decades (Giri, 2012) and across the continents. There are continual changes in land use in many parts of Tanzania. They occur in response to various situations like adverse climatic conditions, changes in population, land pressure and changes in socio-economic conditions that favour or discourage certain changes (Ngailo *et al.*, 2001; Msoffe *et al.*, 2011). It is also influenced by increasing human activities which have increased the demand for agricultural land, forest, pasture, urban and industrial, building, grazing animals and for cultivation of both food and cash crops (Fredy *et al.*, 2014 and Nzunda *et al.*, 2013). Nevertheless, cultural differences have important impacts on direct drivers to land use change (Nelson *et al.*, 2006).

Walsh (2012), Ngailo (2011) and Ngailo *et al.* (2001) showed that land use and land condition changes related to pastoralists have a role in the evolution of farming systems in Tanzania. Ellis (2013) and Devisscher (2010) described the role of demographic and socio-economic processes in altering the environment and that land use and condition change are normal human behaviour of modifying the world.

According to Mwilawa (2003), Rufiji District started receiving pastoralists and agro-pastoralists from different places in Tanzania in the beginning of the 2000s. In March

2006, the government of Tanzania, through the Office of the Vice President, issued a statement declaring the eviction of pastoralists, agro-pastoralists and small scale holding communities from Usangu Basin in Mbarali District and Kilosa and Kilombero Districts (Mvulla and Kawawa, 2006). This aimed at conserving the Usangu-Ihefu Wetland as pastoralists were named as the critical causes of environmental degradation in the areas.

The land use and land conditions changes since the pastoralists and agro-pastoralists arrival in the Rufiji District have not well been studied. This was the motivation towards this study which was conducted in Rufiji District. This paper examined the influence of pastoralists on land use change in the study area. Specifically, it describes the pastoralists and their livestock registration status; assessed land allocation, identified changing nature of land use, distribution, condition; explains factors influencing land use changes, and finally describes peoples' perception on the changing nature of the land use conditions in the study area. The paper is guided by the Malthus' Population Theory (1798). The theory considers both migration and population increase consequences, and migration is regarded as one of the factors for population increase. The theory postulates the dangers population growth exerts over the resources.

2.3 Methodology

2.3.1 Study area

The study was conducted in Rufiji District, one of the six districts of the Coast Region in Tanzania. The district land size is 1,334,000 ha of which 47% constitutes Selous Game Reserve; 36% is general land where settlements and agricultural activities are permitted; 12% is protected forest and 5% consists of rivers, swamps, lakes and the Indian Ocean (Mkindi and Meena, 2005).

2.3.2 Research design

A cross-sectional research design was employed. It was preferred to a longitudinal study design because of limited resources such as finance and time available to pursue the study. In a cross-sectional study respondents are interviewed at a single point in time (Mann, 2003) which saves money and time. However, in a longitudinal study, researchers conduct several observations of the same subjects over a period of time, sometimes lasting many years (Institute for Work and Health, 2009). Cross-sectional design was also preferred as it supported both quantitative and qualitative analyses techniques.

Another merit of a cross-sectional study design is that it allowed the study to compare many different variables at the same time. It was possible, for example, to look at number of pastoralists and livestock received, number of years pastoralists have spent in the study area as well as newly introduced economic activities in relation to land use changes in the study area.

2.3.3 Sampling and sample size

The district was picked purposefully among other districts of the region because it started experiencing the influx of pastoralists in the 2000s compared to other districts. This was also fuelled by the arrival of the Usangu and Kilombero evicted pastoralists in 2006 were directed to move to the district (Mvulla and Kawawa, 2006). Five villages were involved out of 20 villages which received pastoralists. The k^{th} factor formula was applied to pick the villages whereby 20 villages which received pastoralists were subjected to the formula. The sampling fraction was used to get the first village in a list, whereas other villages were selected by choosing every other k^{th} village. The respondents for the study included village members aged 30 years and above in 2014 and who had been living in the village since or before 2000, on the basis that they had experienced the situation under investigation.

Basing on Bailey's (1994) arguments that a sample of 30 respondents is the bare minimum for statistical analysis regardless of the population size, the study thus involved a total sample of 200 local communities' households' representatives for the survey.

2.3.4 Data sources and collection techniques

Sources of primary data were: key informants, household heads and community members. Secondary information was collected from village reports and relevant research reports. The secondary data collected included: number of registered pastoralists, registered number and types of received livestock as well as the number of pastoralists allocated for each village. The methods of data collection included: key informant interviews, household survey, focus group discussions (FGD) and documentary review. The tools used for data collection were interview guides, questionnaire, and checklists. The household survey on land use change was sought to capture information regarding people's understanding and identification of land use changes as well as interrelated drivers and effects.

2.3.5 Data analysis

Analysis of qualitative data was done through the content analysis which involved quotation of statements, interpretation, identifying variations and similarities of the related arguments. Binary logistic regression was used to test factors influencing land use changes. The dependent variable (Y) attempted to explain whether there were land use changes or otherwise. No land use change was assigned a value of 0 and presence of land use change was assigned a value of 1. The model was presented as follows:

Logit (pi) = log (pi/1-pi) = $b_0 + b_1x_1 + b_2x_2 + b_3x_3 + \ldots\ldots\ldots b_kx_k$

(Agresti, 2002; Powers and Xie, 2000), Where:

Logit (pi) = in (odds (event)), that is the natural log of the odds of an event occurring, in this research

p_i = prob (event), that is the probability that land use changes will occur

$1-p_i$ = prob (no event), that is the probability that the land use changes will not occur

b_0 = constant of the equation

b_1 to b_k = coefficients of the independent variables (predictors)

k = number of independent variables

x_1 to x_6 : Independent variables for land use changes entered in the model

x_1 : Number of pastoralists received

x_2 : Number of livestock owned by pastoralists

x_3 : Population size of the area

x_4 : Number of years spent by in-migrant pastoralists

x_5 : Number of economic activities introduced in the area

x_6 : Natives' involvement in livestock keeping

2.4 Results and Discussion

2.4.1 Pastoralists' livestock number and land allocation

The Tanzania land policy emphasizes transparency on land administration (URT, 1997). This is contrary to the pastoralists' arrival processes in Rufiji District. The findings showed that their arrival involved cheating as some were not registered and others registered less the number of livestock than they actually owned. This resulted in the villages ending up without correct records on the number of people and livestock received. For example, it was described in an FGD:

> "*.....At Muyuyu village in the beginning of 2005, six pastoralists were registered with 7000 cattle, but in few months later the number rose to about 50 pastoralists,*

but the number of livestock was not recorded ..... " (FGD, Muyuyu, 18th January 2014).

The results support the findings by Barbour and Prothero (1962) who described that Africa is a unique region from which it is difficult to draw important empirical evidence about people's migration. This is perhaps due to improper record keeping in the continent. The results from this study imply that more herds and population of livestock have actually been moved to Rufiji District and therefore the village land use plans and the carrying capacity are likely to have been jeopardized. It was further reported that other pastoralists came in without being registered as they came under the umbrella of the few registered colleagues. For example, it was described that:

"*....in-migrant pastoralists were avoiding the wrath of residents by splitting up their livestock herds. Any excess was divided among elder sons as a way of showing that an individual was in possession of a small number of cattle...* " (FGD, Muhoro, 27th January 2014).

This statement implies that there is a larger number of livestock received in the study area than what has been officially recorded and registered. The increasing number of livestock moved in the district has affected the village land use plans, especially on crop production.

The five villages in total received 14 840 cattle, 1014 goats, 211 sheep and 75 donkeys from 38 registered pastoralists. However, it was reported by one of the key informants that in reality on average each pastoralists' family owned between 3000 and 5000 cattle. This implies challenges on the village land carrying capacity to accommodate livestock. As required in the Village Land Act (URT, 1999) and the Rural Farm Lands Act (URT, 2002)

on land allocation, all villages were required to allocate the lands. The total land size allocated by the four villages was 17 888 hectares (Table 2.1). The findings show that all the villages in the study area complied with the national land policy (1997) and the village land act (1999) which requires the villages to allocate and plan for sustainable land use plans at the village level in order to minimise land use conflicts and enhance sustainable village land use plans.

Table 2.1: Pastoralists and number of livestock and village allocated land size

Village	Number of pastoralists	Cattle	Goats	Sheep	Donkey	Total land size (Hectares)
Nyamwage	8	920	132	57	16	3 106
Muhoro	10	3 700	160	26	27	2185
Kiwanga	5	1 120	292	37	12	2 500
Muyuyu	6	7 000	100	49	9	5 073
Chumbi A	9	2 100	330	42	11	250
Total	**38**	**14 840**	**1014**	**211**	**75**	**17 888**

Source: Surveyed villages' reports

2.4.2 Land use changes, distribution, possession and acquisition

The results in Table 2.2 show that the majority of the respondents (84.5%) acknowledged the existence of land use changes in the study area; while 15.5% reported that they had never observed any sign of land use changes. These findings generally indicate that, in the study area, the coming of pastoralists has caused changes in land use. This may be in the form of expansion of previously existing land uses or introduction of new land use practices in the land. The evidence provided for the land use changes include: establishment of new settlement areas, establishment of new farming lands, drying of the wetlands, and destruction of vegetation cover, burning of forests and observed signs of soil erosion.

Table 2.2: Responses distribution on occurrences of land use change (n=200)

Land use change occurrence	Percent response distribution by villages (%)					
	Nyamwage	Muhoro	Kiwanga	Muyuyu	Chumbi A	Total
No	4.5	4.0	3.5	2.0	1.5	15.5
Yes	15.5	16.0	16.5	18.0	18.5	84.5

Moreover, respondents were required to mention whether pastoralists and other in-migrants (investors influenced by the coming of pastoralists) had acquired land apart from the land areas allocated to them. All the respondents reported that the in-migrant pastoralists had also acquired land in the farm lands. This means that pastoralists have dispossessed some local people's part of their formerly owned land hence the size of land among the local people has got reduced.

Furthermore, it was stated that land uses were few before the arrival of the pastoralists in many villages. This was due to the nature of socio-economic activities carried out by the local people. The findings in Table 2.3 also showed that at village level, especially in the study villages, major and dominant land use types were: agriculture which included crop cultivation (both food and cash crops), human settlement, forest land and burial sites. The arrival of pastoralists introduced livestock grazing. This was not initially an activity carried out in the district; however after the pastoralists' arrival livestock keeping became among the dominant land uses, ranking the third (24%) after human settlements (27%) and agriculture (33%).

Table 2.3: Ranking land use distribution before and after pastoralists arrival (n=200)

Before arrivals	Percent	Ranking	After arrivals	Percent	Ranking
Agriculture	36.5	1	Agriculture	33.6	1
Human settlement	33.5	2	Human settlement	27.3	2
Forestry land	15.5	3	Livestock grazing	24.0	3
Burial sites	14.5	4	Forestry land	8.1	4
			Burial sites	7.0	5

The findings in Table 2.3 show that livestock grazing ranked the third land use, swapping with burial land sites and forest land. Livestock grazing has also expanded the land use types from four main land use types to five. Findings by Lubowski *et al.* (2006) showed that the conversion of farm land and forests into grazing land reduced the amount of land for food production. It also results in soil erosion, and other types of soil degradation associated with pastoralists' activities as well as deforestation which reduce the quality of land resources. This happened just because the local people are also engaged in livestock keeping and leading to extended grazing land and human settlements, especially into demarcated and farm land as a result of increase of both human and livestock population.

2.4.3 Factors influencing land use changes

The major constraints contributing to changes in land use and livelihood diversification in many parts of the world include high level of illiteracy, poor agricultural technology and knowledge of proper farming technologies, economic factors such as increasing levels of poverty due to unemployment, social and health factors that interfere with the people's productive capacity, decreased per capita and availability of arable land due to overpopulation and soil degradation due to overuse and lack of fallow periods (Laurance *et al.*, 2014). Using binary logistic regression, the paper determined pastoralists related factors responsible for influencing land use changes. The model contained six independent variables (Table 2.4).

The overall model fit containing all the predictors was statistically significant ($p = 0.000$), indicating that the model was able to predict respondents who agreed about the land use change and those who did not agree on the land use change. The Nagelkerke R^2 was 47.10.395, indicating that the independent variables entered in the model explained 47.1% of variance in the dependent variable and Cox and Snell R^2 was 39.5%. The value of the

Hosmer and Lemeshow Chi-square (6, n = 200, 56.6%), obtained was 5.272, but it was not significant (p = 0.728), implying that the model's estimates fitted the data at an acceptable level (Garson, 2008) because a finding of non-significance means that the model adequately fits the data (Agresti and Finlay, 2009).

Table 2.4: Pastoralists influences on land use changes

Variables entered in the model	β	Std. Error	Wald	df	Sig.	Exp (B)
Number of pastoralists received	-0.117	0.138	0.714	1	0.398	0.890
Number of livestock owned by pastoralists	-0.098	0.036	7.448**	1	0.006	0.907
Population size	-0.079	0.176	0.200	1	0.655	1.045
Years pastoralists lived in a village	-0.601	0.279	4.646*	1	0.031	0.548
Number of economic activities introduced	0.133	0.188	0.501	1	0.479	1.142
Local people's involvement in livestock keeping	0.004	0.003	1.487*	1	0.043	0.924

Valid cases = 200, Goodness-of-fit: Pearson's Chi-Square = 5.272 (p = 0.728); Cox and Snell Pseudo R-Square = 39.5, Nagelkerke Pseudo R-Square = 47.1%
Note: * and ** represent statistically significant levels at $p \leq 0.05$ and $p \leq 0.01$ respectively

The findings in Table 2.4 show that number of livestock had significant influence at $p \leq 0.01$. This implies that the number of livestock which were received had big negative impact on the land allocation for the grazing activities to take place and hence there were possibilities of transforming some parts of land for this purpose. There were some effects which resulted from the livestock keeping activities environmentally and economically, but this was not a concern for this paper. The findings are similar to those of Mwamfupe (2015) as reported in a study done in Rufiji, Kilosa, Kilombero and Kiteto districts. The author asserted that the major complaint was that livestock keepers have contributed to the degradation of rice fields and consequently leading to reduced productivity of the land.

Furthermore, the findings have shown that the number of years pastoralists had lived in a village had significant negative influence at $p \leq 0.05$. The results imply that years

pastoralist stay in certain areas signify increasing amount of land needed for various socio-economic activities which may influence also local people's farm lands. Mbilinyi *et al.* (2013) postulated the impact of livestock on farms as small scale farmers are also affected. In the study areas *Maasai* pastoralists and other agro-pastoralists are blamed to graze their livestock on the farm lands. As they keep on staying in the village, more land is converted into various uses including crop cultivation as well as grazing activities and collection of forests products from the forest lands. In addition to that, the local people's involvement in livestock keeping was also found to have significant negative influence on land use changes at $p \leq 0.05$. It was mentioned that there were few local people who had started to engage in livestock keeping. This resulted in increasing number of people engaging in livestock keeping including the in-migrant pastoralists themselves hence increased demand for land for that purpose.

Moreover, the number of economic activities and local people's involvement in livestock keeping had positive coefficients with β values 0.133 and 0.004 respectively, implying that any increase in magnitude of these variables would result in higher possibilities of land use changes. On the other hand, the number of pastoralists received, number of livestock owned, population size in the area and years pastoralists had lived in a village had negative coefficients (β values) -0.117, -0.098, -0.079 and -0.601 respectively implying that the variables influenced land use changes negatively. These findings are in line with what was described by Bello and Arowosegbe (2014) who also attributed the mentioned factors to land use changes. As one interviewee said:

> "*.....the expansion of grazing land in the area causes many socio-economic impacts to the side of the crop producers.....*" (Interview, Kiwanga, 22nd January 2014).

According to them, the major socio-economic impacts of land use change are loss and destruction of agricultural land which results in loss of income gained from farm and sometimes leading to food shortages.

In general, the growing population and increasing socio-economic needs in the area creates pressure on land use change. This pressure results in destruction of agricultural and extension of grazing land. It was further revealed by participants during the FGD that the current land use change around the study area has been linked to various environmental problems such as habitat destruction, soil degradation, water pollution, loss and destruction of wildlife habitat. Same results were also reported by Laurance *et al.* (2014) who pointed out that the land use change can also have direct significant effects on ecosystem structure and on tree cover. In on of the FGD it was explained that:

> "....*we were used to hunting wild animals in the nearest forests, but the coming of these pastoralists has made the animals we were hunting to be rarely found as they burn forests, they graze in the forests...we cannot find the animals for easy hunting*...." (FGD, Muhoro, 27th January, 2014).

Wald coefficient is a measure of the distinctive contribution of each independent variable in the perspective of the other independent variables and holding constant other independent variables. Wald coefficients corresponding with individual independent variables assist to realize the relative importance of each independent variable with an indication that the bigger the Wald coefficient of an independent variable the higher the contribution of the variable to the occurrence of the dependent variable (Agresti, 2002; Garson, 2008). In this case the number of livestock owned by pastoralists. Basing on the results (Table 2.4), pastoralists' number of livestock owned, with Wald statistic of 7.448

had the biggest influence on land use changes compared to other variables. This concurs with what was found by Boundeth *et al.* (2012) about land use change and its determinant factors whereby numbers of livestock owned influenced land use changes as more land was demanded for pastures. Information obtained from the key informants confirmed that the increasing number of pastoralists together with their livestock results in disturbance of the local environment which in turn affects the valuable and traditional land uses, and hence affecting habitat for many wild life species.

The odds ratio (Exp (B) for a given independent variable represents the factor by which the odds in this change for a one-unit change in the independent variable. Odds ratios less than 1 indicate decreases in the odds; odds ratios more than 1.0 indicate increases in the odds; an odds ratio equal to 1.0 indicates that the independent variable has no effect on the dependent variable. Results from the study revealed that the odds ratios (EXP (B)) for number of economic activities were 1.142. This means that number of economic activities perception increased (because B was positive) the odds of land use change by a factor 1.142. Therefore, the respondents who were aware of land use change were 1.142 times more likely to report that number of economic activities had influence on land use change than any other factors mentioned in Table 2.4. One of the key informants said that:

> "*....the current land use change in the study area results into fragmentation of land and water sources pollution and destruction in the area...local people have been engaging in various economic activities they have never experienced before; others have concentrated more on crop production than they have been doing before....*" (Interview, Nyamwage, 13th January 2014).

This quotation implies that the coming of pastoralists had positive effects on the land uses which have also impacted other socio-economic systems of the local people.

2.4.4 Respondents' perceptions on the current land use condition

Responses from the study demonstrate that land conditions (physical appearance of settlement lands, wetlands, grasslands, forest lands and agricultural lands) have been altered as compared to the period before the arrival of pastoralists. Tilman *et al.* (2011) demonstrated that expansion of cultivation in many parts of the world has changed land to more agro-ecosystems and clearance of natural vegetation. The findings in Table 2.5 show that settlement land had increased (expanded) as reported by the majority (57%) of the respondents. The increasing number of pastoralists in the area was reported to be one of the factors to such change. They influence establishment of new settlements in places which were not in use and which were not allocated for the newcomers. This is in line with what is stipulated by Schneider *et al.* (2011) on the impacts of populations increase on environmental conditions. These results imply that land use and land conditions were happening as a result of population increase in the study area.

Table 2.5: Perceptions of land use change after pastoralists arrival (n=200)

	Percent distribution of responses (%)			
Land use type	**Expanded**	**Decreased**	**Unchanged**	**Invaded**
Settlement land	57.0	8.0	17.0	18.0
Agricultural land	41.0	12.0	14.5	32.5
Wetland	5.0	42.5	5.5	49.0
Grassland	2.5	52.5	4.0	41.0
Forest land	4.0	40.5	6.0	49.5

The findings in Table 2.5 further indicate that a large number of the respondents (41%) indicated that agricultural lands had extended, while 32.5% contended that the lands had been invaded. Croplands have been converted into pastures as well as settlement lands. One of the influencing factors for the changes was the increasing number of livestock in

the study areas. The findings are similar with those by Havlik *et al.* (2012) who also found the impacts of livestock keeping on the land use changes and its effects on crops. Moreover, it was reported that the agro-pastoralists had influenced extension of cultivated lands as they increased establishment of new farms in areas formerly not used for crop farming.

A study by Armstrong *et al.* (2010) has established detrimental effects of livestock grazing on water quality in streams and lakes. In the study area the arrival of pastoralists unquestionably has brought changes in the wetland features. Many (49%) of the respondents declared that the wetlands had been invaded, and 42.5% observed that wetlands were getting reduced in quality like being destroyed and polluted (Table 2.5). The influencing factors included: number of livestock and the increasing number of pastoralists and agro-pastoralists; these had increased demand for water for various uses and led to effects over water quality in the grazing areas. The other effects include destruction of water sources such as rivers, ponds, wells and water channels. These observations are in line with findings by Ciparis *et al.* (2012) who described the effects of watershed densities of animal feeding operations on nutrient concentrations and estrogenic activity in agricultural streams. The observed indicators of reduced water quality and destruction of water sources include: water pollution, disappearance of some water sources and stream bank erosion. It was reported that *Lule* and *Wambanda* areas (sources of water for household use) at Muhoro village were drying and were by then waterless.

Furthermore, more than a half (52.5%) of the respondents in the study areas testified that grasslands had declined in size (Table 2.5). The reasons given were: establishment of new settlements, crop production and livestock grazing as a result of livestock grazing activities. Likewise, Kioko *et al.* (2012) described that continuous grazing within an area

may lead to loss of vegetation, with long-term implications for the health of the grassland conditions. This study observed the signs of declining grass lands including, bare lands and gullies as a result of absence of vegetation cover to protect water runoff in some areas. It was also found that it is necessary to have controlled grazing activities (identify special places for livestock grazing) to maintain the grasslands in good conditions to supply ample feed for the livestock.

Moreover, the findings in Table 2.5 show that 49.5% of the respondents reported that the forest lands had been invaded while 40.5% contended that the forest land was destroyed by decreasing in size. The influencing factors include the increasing number of livestock and presence of pastoralists which have increased the demand for land as caused by population increase (both human and livestock population). These led to the establishment of new settlements, new crop farms opened, expanding livestock grazing areas and increased forest fires when fire is used to clear vegetation for crop farming and to encourage regeneration of new pastures. Similar findings were also revealed by Nzunda *et al.* (2013) who observed that the increasing demand for lands for crop production and pastoral activities may pave a way for agricultural lands expansion, resulting in forests encroachment.

The major effects reported to have been observed include destruction of the vegetation cover and land degradation. The drivers associated with the arrival of pastoralists include population growth, expansion of farming land, extraction of fuel; wood and increased number of livestock population in the area. Ngailo *et al.* (2001) postulated that people require trees for building their homes and need pastures for feeding their animals. Ngalande (2002) and Nzunda *at al.* (2013) described that agricultural expansion is among the reported activities, which have significant effect on natural vegetation. The results of

this study have shown changes in the conditions and uses of settlement lands, cultivated lands, wetlands, forest lands, and grasslands which are associated with the arrival of pastoralists. The implication is that the areas are vulnerable via reduced size and quality by being invaded for several activities like crop production, pastures, forest harvesting and human settlements establishment.

2.5 Conclusions and Recommendations

This paper examined the influence of pastoralists on land use change. Specifically, it describes the pastoralists and their livestock registration status; it assesses land allocation; it identifies changing nature of land use, distribution, condition; it explains factors influencing land use changes, and finally it describes peoples' perception on the changing nature of the land use conditions in the study area. Accordingly, the paper was trying to respond to such research questions like what was the actual number of pastoralists and how many livestock were officially registered, what is the land use allocation status before and after the arrival of pastoralists in the study area, and finally what are the current land use conditions as a result of the pastoralists' arrival in the study area.

The arrival of pastoralists involved illegal procedures like cheating on reporting the number of livestock owned by the pastoralists which were deliberately organized by leaders and pastoralists themselves. This is an alert to the authorities as for any activity which is illegal there are possibilities to result in adverse effects as they get implemented.

Pastoralists were continually migrating to the district daily. The migration drives land use and land features changes with some adverse effects. The changes have branded the areas with vegetation clearance, widespread of forest fires, and destruction of water sources.
Land uses have currently changed compared to the time before the arrival of pastoralists. In the past land uses were dominated by, but not limited to, agriculture and human

settlement. After the pastoralists' arrival, land uses are dominated by agriculture, human settlement and livestock keeping. Land use features have also been affected, and the most affected land uses are the grasslands.

The study calls upon the responsible authorities from village to the district levels to ensure that there is truth among them and take proper measures to make sure those unethical procedures are avoided in order to avoid harm to the communities. The study further calls upon community-based land use planning where all villages are involved in the planning of the advent of new comers like pastoralists and agro-pastoralists.

It is also recommended that there is a need for the appropriate land use plans to be developed in order to ensure that land uses are properly established. This should involve identification of grazing areas and making sure that all necessary and required services such as cattle drinking sources of water are found around the allocated grazing lands.

Moreover, it is recommended that there is a need for recounting the pastoralists so that the district can recognize their actual population number. Not only should the recounting be done to the human populations, but also the same should be done to the herds of cattle owned. The recounting will enable the government at the district and village levels to have reliable land use and development planning at both levels in keeping with actual populations of humans and livestock.

The study found the necessity of the situation under investigation to be in a serious precaution because the situation needed attention as pastoralists were increasing and some natives were also undertaking pastoral activities which would lead to increased effects of livestock grazing in wetlands. This can be done by ensuring that cattle drink water from

the appropriate sources of water available for example identified river streams for that purpose.

The study also calls upon the regional and national policy campaigns to protect the land and other related resources in the area to be established and implemented. This is due to the fact that the area is attractive to pastoralists to continue coming in the area to settle and practise grazing activities; hence there are possibilities of continuing land use effects.

The study further calls upon the emphasis on increased formal and informal land conservation activities within the study area which involve both the groups (local people and in-migrant pastoralists) which may mitigate or even prevent land use change effects on the ecology of the area in the future. This means land use management should rely on associating traditional and establishing communal managed areas within the district.

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CHAPTER THREE

3.0 Effects of Pastoralists' In-migration on Socio-Economic Activities in Rufiji District, Tanzania

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Target Journal: International Journal of Modern Social Sciences

3.1 Abstract

This study examined the socio-economic changes of the local communities as a result of pastoralists' in-migration to Rufiji District. Household survey, focus group discussions and interviews were applied in the process of data collection. The survey involved 200 respondents, and interviews were mainly done with key informants including extension officers, elders and village leaders while focus group discussions were done with groups of men and women who comprised ten to twelve participants. Content analysis was used in qualitative data analysis. Binary logistic regression was used to assess the impact factors for participation in new economic activities. Ranking technique was used to establish the priority of the mentioned economic activities before and after the arrival of

pastoralists. The findings show that there are socio-economic changes experienced by the local people which are attributed to the arrival of pastoralists in the study area. The changes include: adoption of new economic activities and sources of income, increased host communities' adoption of livestock keeping, intermarriages, dietary change habits, and change of religious practices. The significant factors responsible for the adoption of new economic activities were sex ($p \leq 0.05$), age ($p \leq 0.01$), religion ($p \leq 0.001$) and education level ($p \leq 0.05$). The study concludes that the pastoralists' arrival in the study area had more socio-economic and cultural advantages than the disadvantages and gives recommendations and policy implications especially on preparing suitable policies which accommodate the socio-economic and intercultural interactions among the two communities.

Key words: Socio-economic, cultural interactions, migration, in-migration.

3.2 Background Information

Since the beginning of 2000, Rufiji District has been experiencing an influx of pastoralists and agro-pastoralists from different areas in Tanzania. In March 2006, the government of Tanzania, through the office of the Vice President, issued a statement declaring the eviction of pastoralists, agro-pastoralists and smallholder communities from Mbarali, Kilombero and Kilosa districts (Mutekanga *et al.*, 2013). The records show that Rufiji received a large number of cattle (18 000) compared to Kilwa (8000 cattle), Bagamoyo (4958) and Lindi Rural (4000). Kisarawe was not among the districts in the Coast Region which received the in-migrant pastoralists because it was not prepared to host them. Pastoralists and agro-pastoralists who were required to move into the district were directed to Bagamoyo District (Mvulla and Kawawa, 2006).

Pastoralists are characterised by migration life styles as determined by availability of pastures and favourable weather conditions for their livestock. This life style is forced by socio-ecological, biological, climatic, policy and legal provisions factors, among others (Be'lair *et al.*, 2010). As such, pastoralists migrate in search for pastures as influenced by various factors (Rass, 2006) and (Shem *et al.*, 2010). Migration is among pastoralists' coping strategies to the challenging ecological, climatic and biological situations (Gemenne *et al.*, 2014). These migrations are by no means occurring without socio-economic and cultural effects to the destinations areas. These effects are critical concerns among development practitioners (Ratner *et al.*, 2010).

According to Epstein (2010), culture and identity play a central role in understanding of migration as an economic phenomenon. Epstein (2010) explained the manifestation of culture in migration processes. Cohen (2011) linked migration and culture and stressed statistical and economic factors of migration. Apata (2011) indicates that migration is one of the adaptation measures to climate change. These are among the authors who have tried to explain the interrelationship between economic, culture and migration or socio-cultural aspects of migration issues. The authors bring culture into the open through their arguments and what unites them is an understanding that though actors behave differently within a group, there are economically important shared beliefs (customs, values, attitudes, etc.). The authors discussed the effects of pastoralists' migration on socio-economic and cultural aspects and its implications as a specific case.

The precise nature and extent of socio-economic and cultural effects to the local people of the destination areas is, however, not well known. Since migrations are geographic-specific, their effects on socio-economic status to the native communities and the ensuing cultural relations in the host areas are important to be investigated. This paper examined

the socio-economic changes of the local people as a result of pastoralists' in-migration into the district. The paper specifically assessed changes in conventional and introduction of new socio-economic activities among local people, highlighted local people's households engagement in livestock keeping as a result of pastoralists' arrival, examined factors influencing their engagement in new economic activities and finally assessed and explained pastoralists and local people cultural interactions.

3.3 Methodology

3.3.1 Study area

The study was conducted in Rufiji District of the Coast Region. Traditionally, people in the District engage in small scale farming and fishing (villages along Rufiji River and the Indian Ocean) activities. The district is among the areas appointed by the government to receive the 2006 Mbarali and Kilosa evicted pastoralists and agro-pastoralists.

3.3.2 Sampling procedures

Purposive sampling was used to pick Rufiji District among other districts in the Region. According to Makoye (2012), Rufiji District received a larger number of pastoralists and agro-pastoralists (2630) with 272 800 cattle, 51 160 goats and 20 120 sheep as compared to other districts in the Region namely Kilwa (8000) and Bagamoyo (4958). Purposive sampling was applied to pick the required number of respondents whereby the population for the study was all household members aged above 30 years and who had been living in the village since or before 2000. This was done purposively due to the fact that demographically, all these respondents by the year 2000 were aged 13 years and above, and they had been living in the village for more than fifteen years since 2000. These were expected to have had adequately experienced the situation under investigation. Rufiji District had 44 342 households and, due to the minimum socio-economic and cultural

homogeneity variations among local people, the study involved 40 respondents from 40 households from 5 villages, making a total of 200 respondents for the household survey.

Systematic random sampling by the use of the k^{th} factor was applied to pick five villages for the study out of 20 villages which had received pastoralists in the district. Five villages (25%) which had received in-migrant pastoralists who were allowed to settle and graze their livestock as directed by district authority were sampled.

3.3.3 Data sources and collection techniques

A cross-sectional research design was applied which allowed data to be collected at one point in time, and it was appropriate for descriptive analysis as well as for determination of relationships among variables. Focus group discussions and key informant interviews were conducted. Basing on the facts that Wong (2008) argues that an FGD should consist of between six and 12 people and that the group should not be so large as to preclude adequate participation by most members nor should it be so small that it fails to provide significant coverage than that of an individual interview, the number of participants from ten to twelve was involved in FGD conducted in each village.

The Key Informants (KIs) included extension officers, village officials and elders. A checklist was used to guide the focus group discussions and key informant interviews. A questionnaire was administered during the household survey. Data collected included those regarding household sources of income, economic activities, livestock keeping participation and cultural issues and interactions aspects.

3.3.4 Data analysis

Quantitative data were coded using Statistical Package for Social Science (SPSS). The coded data were transferred into computer code sheets for processing to determine descriptive statistics such as frequencies and percentages. Binary logistic regression was performed to assess the impact of six factors that influenced local people to engage in new socio-economic activities. The dependent variable (Y) attempted to explain whether there was adoption of new activities or otherwise. Not engaging in new activities was assigned the value 0 and engaging in new economic activities was assigned the value 1.

The Wald coefficient of an independent variable, which had higher contribution of the variable to the occurrence of the dependent variable as according to Agresti (2002) and Garson (2008), was also computed. The odds ratio (Exp (B)) to identify the strongest predictor of reporting adoption was also computed. In the analysis of qualitative data there were quotations and interpretations of statements which were all based on the contexts of the given arguments. The implicit form of the binary logistic regression model that was presented is as follows:

$$\text{Logit}(pi) = \log(pi/1-pi) = b0 + b_1x_1 + b_2x_2 + b_3x_3 + \ldots\ldots b_6x_6$$

(Agresti, 2002; Powers and Xie, 2000), where:

Logit (pi) = in (odds (event)), that is the natural log of the odds of an event occurring

p_i= prob (event), is the probability that there is engagement in new economic activities

$1-p_i$ = prob (no event), is the probability that there is no engagement in new economic activities

b_0 = constant of the equation

b_1 to b_k = coefficients of the independent variables (predictors)

k = number of independent variables

X_1 to X_6 : Independent variables for engaging in new economic activities entered

X_1 : Sex of the head of the household (male or female)

X_2 : Age of the household head measured by number of years

X_3 : Religion of affiliation among the household members (Christians only, Muslims only and Christians and Muslims)

X_4 : Education level of the head of the household (number of years in school)

X_5 : Occupation of the head of the household (on-farm and off-farm employment)

X_6 : Household size (number of household members)

3.4 Results and Discussion

3.4.1 Pastoralists' effects on local people's socio-economic activities

To evaluate the socio-economic effects and cultural interactions of the local people, the study had to undertake an assessment of the various variables basing on the following aspects: sources of income, new economic activities, household livestock keeping engagement, factors prompting local people's engagement in new economic activities and experienced change through interactions among them and the new comers (religion, intermarriages, dietary habits, cultural values and norms) as reported after the pastoralists' arrival. These factors are described in detail in the following sub-sections.

3.4.2 Previous sources of income and economic activities

Prior to the arrival of the pastoralists in the study area, the residents had been involved in various income generating activities. The findings show that the majority (84%) of the respondents were engaged in crop production while 8% of the respondents were engaged in fishing and coconut vending, and 5% were employed in vehicle driving, masonry and tailoring and very few (3%) were engaged in livestock keeping (Table 3.1). Food crops were primarily produced for home consumption though the surplus was sold. Cash crops

included coconuts and cashewnuts. Thus, before the advent of pastoralists, few local people were involved in livestock keeping. This fact has also been described by Mvulla and Kawawa (2006) that before the arrival of pastoralists in Rufiji District there was little experience of pastoral activities as compared to Bagamoyo District, which had long established interactions with in-migrant pastoralists. It was pointed out that farming activities had been the major economic pursuit in Rufiji District with paddy, cassava, maize production and various types of vegetables and fruits dominating. The findings indicate that, basically, before the interactions with new comers people in the study area were limited to such economic activities.

Table 3.1: Local communities' previous sources of income (n=200)

Sn.	Sources of income	Involved Respondents (%)
1	Crop production	84
2	Fish and coconut vending	8
3	Self employed	5
4	Livestock keeping	3

3.4.3 Expansion of economic activities and sources of income

It was reported that about seven new sources of income and economic activities had been introduced in the study area. These included food crops production and selling (including sweet potatoes, millet, sorghum as well as legumes like beans) which are produced for consumption and commercial purposes. After the arrival of pastoralists the local communities had been able to open retail shops and meat shops (butchers), engage increasingly in charcoal burning and selling, livestock selling (like cattle and goats), selling milk (dairy products), and increasingly timber harvesting and selling (Table 3.2). It was established that the local people were not used to producing the mentioned crops, but they started producing them after they were inspired by the in-migrant pastoralists who migrated into the area with those crops.

Table 3.2: Experiences new sources of income

Sn.	New sources of income	Involved Respondents (%)
1	Establishment of retail shops	20
2	Increased charcoal burning ands	13
3	Livestock selling	12
4	Establishment of milk shops	10
5	Establishment of meat shops	13
6	Increased timber harvesting	9
7	Selling of food crops	23

These results indicate that local people were exposed to new sources of income and were forced to get involved in new economic activities as a strategy for income sources diversification. The findings in Table 3.3 show that the majority of the respondents (67%) had experienced and were aware of newly introduced economic activities, while those who did not have experience and others who had no knowledge of the new economic activities constituted 33%. The newly introduced activities included shop keeping, business vending, selling meat (opening butchery), livestock keeping, and opening bars for beer and other soft and hard drinks selling (selling of alcoholic drinks), while others (5%) reported that they were not sure whether there were any new economic activities introduced after the arrival of the pastoralists.

Table 3.3: Natives' traditional and new economic activities (n=200)

Activity	Responses	Frequency	Percent (%)	Rank
Experiencing new	Yes	134	67.0	1
Economic Activities	No	56	28.0	2
	Not Sure	10	5.0	3
Traditional	Crop production	168	84.0	1
Economic Activities	Home based	12	6.0	3
	Petty business	16	8.0	2
	Employed (nurses & teachers)	4	2.0	4
New	Business vending (establishment of			
Economic Activities	retail shops)	66	49.3	1
	Butcheries	14	10.4	4
	Livestock keeping	39	29.1	2
	Selling alcoholic drinks	15	11.2	3

The findings imply that there is a direct link between pastoralists' arrival and new economic activities in the areas. The local people had no culture of livestock keeping, but

they have been influenced to undertake it. They also execute meat business and opening up alcohol outlets (bars). One respondent pointed out as follows:

> "....*our village was not used to have alcohol shops before the pastoralists' arrival....their arrival has introduced the weekly livestock auction which attracts many people from outside the village...alcoholic drinks (beer) business has become common and our children have opened up retail shops where they sell consumer goods and alcoholic drinks (famously known as viroba)..*" (Interview, Nyamwage, 13th January 2014).

The quotation indicates that there is increased number of local people who are engaging in petty business today, which has been stimulated by the arrival of pastoralists in the study area.

The findings are in line with those by Okoti *et al.* (2004) and Coast (2002) who revealed the changes of economic activities as influenced by livestock keeping activities in Tanzania and Kenya. The findings indicate that pastoralists have influenced the introduction of new economic activities and sources of income. They have also contributed to the improvements of business activities whereby previously local people were engaged in petty businesses but after the pastoralists arrival they have now established businesses like retail shops and meat shops. This is due to the facts that in-migrant pastoralists have stimulated business competitions among residents, the pastoralists themselves and other new comers in the area. Also temporal population increase, especially during the weekly livestock auctions, has promoted market demands and diversified availability of services among the local people and other businessmen.

3.4.4 Households' participation in livestock keeping

The respondents were asked if they were engaged in livestock keeping or if there were neighbours who had been engaging in livestock keeping after the arrival of pastoralists. The aim was to determine any change in household economic activities after the arrival of pastoralists. The majority (54%) of the respondents responded that there were households which did not keep livestock in the past but were then engaged in livestock keeping in their villages, while 46% said they had not witnessed households participating in livestock keeping (Table 3.4). The findings also show that the majority of respondents (90.3%) revealed that many of the households participating in livestock keeping had started it after the arrival of pastoralists; the types of livestock owned included cattle and goats.

Table 3.4: Household engagement in livestock keeping

Activity		Percent responses (%)
Household participation in livestock keeping (n=200)	Yes	54.0
	No	46.0
Households' time started livestock keeping (n=107)	Before	9.7
	After	90.3
Type of livestock owned (n=107)	Cattle only	64.5
	Goats only	4.3
	Cattle and goats	31.2

The findings imply that the existence of local people's households participating in the livestock keeping provides evidence of changing communities' economic activities among the local people themselves. This was also pointed out by PINGOs (2013) that host communities tend to diversify their sources of income by incorporating livestock keeping in their production systems, which was perceived to increase income and improvement of diet. It was also described that the number of livestock kept and of livestock keeping households were increasing year after year. FGD participants described that :

> "*...before the coming of pastoralists the number of resident households who were engaging in livestock keeping was not exceeding ten, and most of them had few numbers of goats and chickens...but since the arrival of pastoralists the number of families keeping livestock like cattle and goats in the village has trebled...*" (FGD, Kiwanga, 23rd January 2014).

This statement implies that the majority of the local people in the study area were indeed not used to livestock keeping, but currently they have been attracted to engage in livestock keeping.

3.4.5 Factors influencing natives' engagement in new economic activities

To determine the main factors influencing local people's engagement in new economic activates, binary logistic regression was conducted to assess the effects of various factors on the chances that local people would engage in new economic activities. The results are shown in Table 3.5. The β-coefficients (positive or negative) were computed to obtain the direction of the predictor variables' impacts. Wald coefficients were also computed to identify the independent variable that had the highest contribution to changes that occurred in the dependent variable. According to Agresti (2002) and Garson (2008), the Wald coefficient of an independent variable shows the magnitude of contributions of the independent variables to the occurrence of the dependent variable.

The full model with all variables was statistically significant (Chi-square 6, n=200, 53.9%, $p = 0.000$) indicating that the model was able to distinguish between respondents who engaged in new activities and those who did not. The model as a whole explained between 43.7% (Cox and Snell R^2) and 51.7% (Nagelkerke R^2) in engagement status, and correctly classified 73.5% of cases. The findings in Table 3.5 show that four out of six independent

variables made a unique statistical significant contribution to the model. These include household heads' level of education (p = 0.049), age of the household head (0.006), natives' religion (p = 0.000) as well as sex of the household head (p = 047).

Table 3.5: Factors influencing local people's engagement in new economic activities

Model variables	β	S.E.	Wald	df	Sig.	Exp(B)
Sex of the household head	-0.580	0.292	3.933*	1	0.047	0.560
Age of the household head	0.469	0.171	7.502**	1	0.006	1.599
Religion	1.731	0.365	22.542***	1	0.000	5.649
Household head level of education	-0.574	0.291	3.876*	1	0.049	0.563
Household head Occupation	-0.061	0.375	0.026	1	0.872	0.941
Household size	0.307	0.266	1.330	1	0.249	1.359

Valid cases = 200. Goodness-of-fit: Pearson's Chi-square =6 (p=0.000); Cox and Snell Pseudo R^2=43.7% and Nagelkerke Pseudo R^2=51.7% and classified percent of cases=73.5%. Note: ***p≤0.001, ** p≤0.01 and *p≤ 0.05

The findings in Table 3.5 show that age of the household head had positive significant influence (0.469) on engagement in new economic activities at $p \leq 0.01$. The cross-tabulated findings in Table 6 show that the demographic active ages 30 to 39 and 40 to 49 had larger percentages of respondents (45.1% and 50.5% respectively) who acknowledged being involving in newly introduced economic activities. The results imply that the demographic maturity age (30 to 39 and 40 to 49) is most likely to respond positively to engage in the new economic activities. These findings are in line with those by Mafimisebi *et al.* (2006) who found that there is a positive significant relationship between adoption index of new economic activities and income and adopters' age. The age between 30 and 50 years was more likely to involve in new economic activities than ages either below 30 years or above 50 years. The findings imply that the greater the age the less the engagement rate as the elders have been sparsely undertaking new economic activities in the study area.

Table 3.6: Household engagement in new economic activities responses basing on age of the level of education of the household head and religion of household members

Variables	Attributes	Response distribution (%) Yes	No
Religion of the household members	Muslims only	33.1	66.9
	Christian only	64.4	35.6
	Christians and Muslims	31.8	68.2
Age of household head age	30-39	45.1	54.9
	40-49	50.5	49.5
	50-59	35.8	64.2
	>60	37.1	62.9
Household head level of education	7 years	75.3	24.7
	11 years	35.9	64.1
	1 year	13.3	86.7

The religions of affiliation were found to have significant positive influence (1.731) on local people's engagement in new economic activities at $p \leq 0.001$. The findings mean that the local people have realized the socio-economic importance of the newly introduced activities. Furthermore, the cross-tabulation results in Table 6 show that the majority of households with members who were Christians only (64.4%) agreed to engage in newly introduced economic activities than those with Muslims only (33.5%) and those with both Christians and Muslims (315%).

These findings imply that there are variations in undertaking new economic activities basing on religion of the household members whereas the Christians are more likely to take new economic activities and engage in them very seriously as compared to Muslims. The findings further revealed that religion has influence on influencing households or individual community members to engage in certain economic activities as stipulated in the studies on economics from religious perspectives. Mangeloja (2004) argued that changes in belief systems can significantly influence individual behaviour in the same way as conversional economic motivations, such as maximisation of individual profit utility.

However, religion was also found to be the strongest predictor in influencing adoption of new economic activities as compared to other variables recording an odds ratio (Exp (B)) of 5.649. This indicates that respondents who reported to have engaged in new economic activities were 5 times more likely to report religion as a factor for engagement in new economic activities after the arrival of pastoralists than those who did not report engagement in new economic activities while holding all other factors constant in the model. Furthermore, the religion factor was found to have the highest contribution (Wald statistics 22.542) on influencing engagement in new economic activities among the natives as compared to other variables. These findings are in line with those by Audretsch *et al.* (2007) who argued that religion influences people's decision to become entrepreneurs. They further suggested that values and attitudes are as much a part of economy as institutions and policies are. The authors' findings and those from this study suggest that there is a link between religion and economic behaviour.

The findings show that household head level of education had significant impact ($p \leq 0.05$) in influencing the natives to engage in new economic activities. This implies that the level of education one possesses affects the choice of type of economic activity to involve in; meaning that the level of education influences the choice of an economic activity to engage in. The findings in Table 3.6 indicate that, as far as education is concerned, the majority (75.3%) of households whose heads had completed primary education (that is who had attended school for seven years) were reported to have been engaged in new economic activities as compared to other levels of education. However, the level of education was found to have an odds ratio (Exp (B)) of 0.563 which was less than 1 compared to other factors, indicating that for every increased level of education respondents were 0.563 times less likely to report having adopted new economic activities after the arrival of pastoralists, holding other factors constant in the model.

Furthermore, the findings in Table 3 show that sex of the household head contributes significantly to the household engagement in new economic activities among the local people at $p \leq 0.05$. The findings are contrary to those reported by Dossa *et al.* (2008) who found that there was no significant impact of sex of the household head on influencing people (members of the household) engaging in new economic activities. On the other hand, the findings of the present study support those reported by Hashmi *et al.* (2007) who analysed gender roles in livestock management. The authors explained the significant influence and importance of women involvement in livestock management and also explained that the involvement of women in such activities like livestock keeping has increased family income level.

3.4.6 Pastoralists and local people cultural interactions

The findings in Table 3.7 indicate the occurrences and incidences of cultural interactions as a result of pastoralists' arrival in the study area. The interactions occur in areas of intermarriages, dietary habits, religion (they admitted that there is an increasing number Christian believers), traditional norms and beliefs, dowry payments and the use of traditional ways in disease treatment and healing. The findings are in line with what was pointed out by Bhugra (2004) who noted that components of cultural identity include religion, rites of passage, language, dietary habits and leisure activities, which could be attributed to interactions among communities. The respondents were required to explain whether they had been experiencing cultural interactions incidents. The leading aspects which were reported to portray cultural interactions is intermarriages (74%), dietary habit change (67.5%), religious interactions (48.5%), exchange of traditional beliefs (44%), and finally exchange of traditional norms (43%).

Table 3.7: Percent responses on incidents of cultural interactions between the local people and the in-migrant pastoralists (n=200)

S/No.	Cultural interactions	Yes (%)	No (%)
1.	Intermarriages	74.0	26.0
2.	Dietary habits changes	67.5	32.5
3.	Religious (worshiping)	48.5	51.5
4.	Share of traditional beliefs	44.0	56.0
5.	Traditional norms	43.0	57.0

Intermarriages are reported to be one side that only local people (women) were married to pastoralists either permanently or as concubines (not accepted by parents of both or one side). These findings are in line with those reported by Maswaga (2013) who did a study on the potential and limitations of in-migrant pastoralists in Songea rural and found that the in-migrant pastoralists in the study area had led to the growing of social interactions between pastoralists, agro-pastoralists and farmers. In the study area it was furthermore expressed that, in changing dietary habits, local people had been consuming milk as it became readily available after the arrival of the pastoralists. They also took sweet potatoes and other food stuffs they never had before.

Furthermore, during the survey it was not reported if there was any member of the agro-pastoralists and pastoralists who was converted to Islam, but only few residents Muslims women were converted to Christianity when they married pastoralists. Traditional beliefs and norms interactions largely remained constant without changes as influenced by the intercultural interactions. These results are however contrary to the findings reported by PINGOs (2013) who found that cultural and traditional practices of cattle-wealth sharing through marriage is highly impeded. The PINGO's findings were echoed by one discussant who commented that:

> "*.....it will be difficult for my sons to get married to a pastoralist as we cannot afford to pay bride price...*" (FGD, Muhoro, 27th January 2014).

This quotation indicates that in the study area there are indeed incidents of intermarriages between the new comers and the local people. It further implies that there is introduction of cattle as dowry for marriage while at the same time implying that there is a rise of dowry price during marriage.

3.5 Conclusions and Recommendations

This paper was responsible for the second specific objective of the thesis. The paper was examining the socio-economic effects of pastoralists' in-migration in the study area. The paper examined the new socio-economic activities introduced by the pastoralists, established the local people's involvement in the newly introduced socio-economic activities and also to identified the most influencing factors for the local people's involvement in the new socio-economic activities.

The findings from this study have revealed that the coming of the pastoralists to the study area has brought in significant socio-economic changes among the local people, like change of sources of income and socio-economic activities.

The local communities are able to engage in livestock keeping which was traditionally practised by few of them. The findings have also shown that there are some elements and incidents of cultural interactions between the local communities and the pastoralists. These interactions included intermarriages, dietary habit changes, worshiping and exchange of traditional norms and values.

Basing on the mobility nature of pastoralists in Tanzania, the study calls upon policy response in several areas related to pastoralism, settlement policies and all cross-cutting sector policies. All the development policies in Tanzania have identified the possible

actors and stakeholders: in this case, therefore, the study makes emphasis of the stakeholders' actions in implementation of the planned development activities in the study area in relation to well established opportunities which have been created by the arrival of pastoralists.

It is also recommended that there should be policies and programmes interventions through the establishment of good relationship between receiving communities and in-migrating pastoralists. This can be done by all stakeholders including the government itself, Community Based Organizations, Non-governmental Organizations as well as the Civil Society Organizations.

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CHAPTER FOUR

4.0 Land Use Conflicts Escalation as an Aftermath of Pastoralists In-migration in Rufiji District, Tanzania

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Target Journal: International Journal of Modern Social Sciences

4.1 Abstract

This study examined the land use conflicts escalation caused by pastoralists' in-migration in Rufiji District. Household survey, focus group discussions, interviews and documentary reviews were used for data collection. Content analysis was the main techniques for analysing data which were collected through the key informant interviews and focus group discussions, but the data collected using the questionnaire were analysed using descriptive statistics. The findings showed that land use conflicts were common in the study area, but that they escalated after the arrival of pastoralists. Before pastoralists' arrival, there were conflicts between villagers and village authorities and also among the villagers themselves. However, after pastoralists' arrival conflicts involved: villagers against pastoralists, village authorities versus pastoralists, village authority versus villagers, villagers versus land invaders, amongst villagers themselves, pastoralists versus agro-

pastoralists, villagers versus investors and investors against pastoralists. The causes of the conflicts included: pastoralists' invading crops farms, pastoralists not observing the boundaries of the demarcated grazing lands, village leaders giving priorities to pastoralists and ignoring crop farmers' rights, lack of government authorities' seriousness on issues related to land use conflicts, and pastoralists refusing to pay compensation for the destroyed crops. It is concluded that land use conflicts and the conflicting actors have increased since the arrival of pastoralists. It is recommended that there is a need to establish proper mechanisms of resettling pastoralists in the study area. There is a need to strengthen locally applied techniques to resolve land use conflicts through the use of elders along with enforcing laws and by-laws and make sure that all villages have established areas for pastoralists and farmers' economic activities. The Government officials should observe the procedures for land allocation as stipulated in the Tanzania Village Land Act 1999.

Key words: Local people, pastoralists, land use conflicts, conflicting parties and conflict mediation

4.2 Background Information

Land plays an important role in shaping rural livelihoods. It is considered a source of wealth, ethnic identity, and social peace, but can also act as a source of conflict. Humans are arguably largely responsible for land and natural resources management because they have the capacity to engage in productive activities that require planning, technology and collective work. For this reason, land has always been an important aspect in defining and reshaping relations between humans, whether individuals or groups (Bashir, 2012).

In Tanzania, as throughout Africa, land is a primary asset for survival and a major source of income and livelihoods for the rural population. It also carries the spiritual values with

it. Therefore, access to land resources is not merely a matter of productive use of the ecological environment; it also involves power and symbolic relations (Meur *et al.*, 2006). Due to increased population pressure and the diversification of rural land use patterns in Tanzania (i.e. expansion of settled and ranching farming, national parks, towns and settlements), access to pastures and water for livestock has declined thus prompting pastoralists to migrate to the central, eastern and southern parts of the country (Odgaard, 2005; and Mattee and Shem, 2006).

Tanzania, like many other developing countries, depends heavily on land for its economic development which is contributed by sectors like pastoralism and agriculture (crop cultivation), with agriculture being the major economic activity as it employs about three quarters of the labour force. In 2010 the agricultural sector provided 76.5% share in the country and contributed 24.1% of the GDP (URT, 2011). However, land problems are currently increasing as population increases, thus demanding more land to sustain the increased need for both food and income.

In recent decades, farmer-herder conflicts in many parts of Sub-Saharan Africa have escalated into widespread violence, loss of property, massive displacement of people and loss of lives (Hussein *et al.*, 2000). This situation has been caused by increasing pressure on resources and decreasing efficiency of traditional conflict-management mechanisms (Thebaud and Batterbury, 2001). Factors such as inadequate grazing reserve and stock routes, changes in land tenure system, insufficient legislation, pastoralism, economic factors and climate change have been identified as long-term causes of the conflicts. It is argued that conflicts between farmers and herders originate from competition for resources caused by population growth, migration and land degradation. Davidheiser and Luna (2008) also cite factors such as international development projects, demographic changes, and environmental degradation to have contributed to the conflicts.

Traditionally, land use conflicts in Tanzania were experienced in the margins between pastoral lands and protected lands (Mwamfupe, 2015). In recent decades, however, farmer-herder conflicts have increased and spread southward and south eastwards of the country covering Kilosa, Mvomero, Kilombero districts of Morogoro Region, Kiteto District in Manyara, Rufiji and Mkuranga districts in Coast, Kilwa District in Lindi, Mbarali District in Mbeya and parts of Kongwa District in Dodoma Region. Other districts include Handeni and Kilindi in Tanga Region. They are also occurring in parts of Rukwa and Tabora regions (Mwamfupe, 2015). According to HAKIARDHI (2009), most land use conflicts in Tanzania are caused by decisions and acts of the state through its various agencies.

Land-use conflicts have some inherent characteristics that make them difficult to deal with. Ideally, they go together with conflict analysis about causes, effects, and preferences and thus supplement classical formal planning instruments. On one hand, land-use decisions involve complex natural systems and processes, long time scales, and uncertainty. On the other hand, land-use decisions are often felt on the regional and local levels, which encompass heterogeneous political, cultural, and societal systems. These are often influenced by supra-regional forces like globalization and broader societal trends, for example, demographic changes, and may substantially differ in their local institutional contexts (Mann and Jeanneaux, 2009).

A review of literature suggests the persistence of land use conflicts in Tanzania which are pastoralists' migrations related (Mwamfupe, 2015; Maganga *et al.*, 2007). Mwamfupe (2015), Makoye (2012) and Mahmoud (2011) have described about occurrence of land use conflicts but little has been done to explain the escalation features which have laid the base for this study. This paper, therefore, examines the land use conflicts escalation as a

consequence of pastoralists' in-migration. It analyses conflicts over land between various actors. Specifically, it analyses the land use conflict actors and describes existence of conflict before and after the arrival of pastoralists, it determines causes of land use conflicts; and it examines land use conflict management and stakeholders involved in the process.

The paper is based on three social conflict model ideas by Dahrendorf (1959), Simmel (1969) and Aubert (1963). According to Dahrendorf (1959), conflict is a struggle between social groups and also is a result of clash of group interests. On the side of Simmel (1969), conflict is merely an intense form of social interactions and is a normal part of the social order. On the other hand, Aubert (1963) classified the types of interpersonal conflicts that arise on dyadic relationship between two individual groups, the sources of these conflicts and the ways of resolving these conflicts.

The conflict model ideas from the above mentioned scholars are preferred because they all dialogue existence of conflict in societies, causes of the conflicts, measures to resolving conflicts, and also they classify the conflict actors. They are thus relevant for this study. However, the theories do not seem to consider the migration attribute and therefore this paper extends the theoretical body by uncovering the role of migration in resource based conflicts.

4.3 Methodology

4.3.1 Study area

This study was conducted in Rufiji District of the Coast Region. The district is potential for agricultural and livestock production. Formerly, out of the total countrywide population of livestock, only 0.44% of the cattle and 1.7% of the sheep and goat

populations were kept in the study area before the massive settlement in 2007 (RCO, 2007). The study was conducted in five villages from four wards: Nyamwage (Mbwara ward), Muyuyu (Ikwiriri Ward), Chumbi A (Chumbi Ward), Muhoro and Kiwanga (Muhoro Ward formerly from Chumbi Ward). The villages were selected due to the fact that they host pastoralists since the beginning the year 2000. They are among the 20 villages where the 2006 evicted pastoralists were directed to move to by the district authority. The selection of these villages enabled the study to share experiences over the existing conflict situation.

4.3.2 Research design and data collection

The study applied a cross-sectional research design which enabled collection of data once at a time. It was preferred to a longitudinal study design because of limited resources such as finance and time available to pursue the study. Data collection methods involved household survey, focus group discussion (FGDs) and Key Informant Interviews. A total of 200 respondents were involved in the household survey whereby each village was represented by 40 respondents from 40 households each represented by a member who was 30 years and above in 2013-2014 and had been in the village since or before 2000. These were selected on the basis that they had experienced the situation under investigation before and after 2000.

Village leaders, land officers and village land committee members were interviewed as key informants. The questions were specifically designed to address existence of land use conflicts in the study areas before and after the arrival of pastoralists for the purpose of explaining changing nature of land use conflicts in the study area. Village leaders and identified elders were interviewed for the purpose of experience sharing on the nature and changes of land use conflicts in the study area. Secondary data like the conflict occurrence

dates and the evidence photos were collected from various sources including research reports, newspaper reports and village documents. The information collected included the evidences on the occurrences of the land use conflicts where dates and the involved actors were identified.

4.3.3 Data analysis

Basically, this paper is qualitative in nature though there are some quantitative data which have been used to supplement the qualitative information. In this case, content analysis was the basic technique for data analysis. Pictures were used to demonstrate the real situation in the study area. Descriptive statistics using cross-tabulations, frequencies and ranking were applied to analyse quantitative information.

4.4 Results and Discussion

4.4.1 Land use conflicts and conflicting parties

The study was interested to examine the incidences of land use conflicts and also to characterize their nature of escalation. This paper has shown the land use conflicts escalations in terms of causes as well as the conflicting parties in the study area. Table 4.1 shows the land use conflicting parties as mentioned and elaborated by respondents in the study area. The findings have shown that during data collection for this study, in the study area, there were seven conflicting parties. These include: the local people versus pastoralists, village leaders versus pastoralists and the local people (villagers) versus village leaders. The other conflicts were the local people and agro-pastoralists versus investors, inter-village conflicts, intra-village conflicts and also pastoralists versus agro-pastoralists.

Table 4.1: Land use conflicting parties (n=200)

Conflicting parties	Responses	Percent based on respondents (%)	Percent based on responses (%)
Local people versus pastoralists	179	89.5	16.1
Village leaders versus pastoralists	164	82.0	14.8
Local people (villagers) versus village leaders	147	73.5	13.2
Local people and agro-pastoralists versus investors	141	70.5	12.7
Inter-village conflicts	114	57.0	10.3
Intra-village conflicts	112	56.0	10.1
Pastoralists versus agro-pastoralists	109	54.5	9.8
Total	**200**	**100**	**100**

The findings in Table 4.1 indicate that all the 200 respondents mentioned at least one type of land use conflict and the conflicting parties, while 179 respondents indicated that the conflict between the local people and the in-migrant pastoralists was the most prevailing land use conflict in the study area. This means that 89.5% of the respondents mentioned this kind of the conflicting parties making a total of 16.1% of the respondents who mentioned this type of land use conflicting parties. The findings imply that almost everyone did indeed mention all the seven identified types of land dispute parties in the study area.

4.4.2 Local people versus pastoralists' conflicts

Before the arrival of pastoralists the majority of local people were crop producers and the minority were engaged in livestock keeping. Since the pastoralists' arrival, farms have been invaded and from time to time they are turned into grazing areas. Pastoralists look for pastures and water for their livestock as it was described that in the areas where pastoralists were allocated to undertake their activities there were no such services for some seasons of the year. It was observed that pastoralists were not settling in allocated areas because the government did not provide them with important infrastructures such as cattle dips (locally termed as "*malambo*"). As a result, pastoralists moved to farm lands

searching for water for their livestock. This led to occurrence of conflicts between the local people and pastoralists. PINGOs (2013) pointed out that the most distressing conflict emerged on 20th May 2012 at Ikwiriri. The problem was also documented, and some of the events are as shown in Plates 4.1 and 4.2. The findings show that local communities and pastoralists are not living peaceful life. These findings correspond with those by Thebaud and Batterbury (2001) who observed that one of the causes of the recurring land use conflicts in Eastern Niger, which is one of the African countries is the increasing pressure on land resources.

It was further described that sometimes conflicts between the local people and the pastoralists arise when there are no agreements on the compensation of the loss caused by cattle invasion in the crop farms. According to farmers sometimes pastoralists refuse to pay for the loss caused, which later on lead to misunderstandings between them. Studies by Owuor (2006) and Odipo (2000), which were done in Kenya, also support these findings by revealing that, in Kenya, the relationship between in-migrant pastoralists and farmers is one of the existing uncertainties. One key informant at Chumbi A said that

> "..... *Pastoralists invade our farms and destroy crops by feeding their livestock on them....when we report the cases to the village leaders later on discussions and after the valuation of the loss has been completed the accused pastoralists are required to pay for the established loss....some of them do not agree with the decisions, and as a result this ends up in misunderstandings between pastoralists and the local people which may extend into fights and destruction of other property and resources owned like livestock, houses, bicycles and motorcycles....*" (Interview, Chumbi A, 20th January 2014).

This quotation indicates that there is involvement of stakeholders in decision making on matters related to land use conflicts. However this has also shown that the measures have some challenges like some actors denying complying with the decisions like that of loss compensations.

Plate 4.1: Farmers' houses were destroyed, gutted by fire and burned during farmers and pastoralists conflicts on 20th May 2012

Source: PINGOs (2013)

Plate 4.2: A truck belonging to a pastoralist owner of a milk processing factory which was burnt by local people on 20th May, 2012

Source: PINGOs (2013)

At Ikwiriri ward, a 60 years old farmer died in an assault by belligerent herdsmen after he denied them access to his paddy farm. This forced the villagers to chase off the alleged killers in revenge. Five people died and several others were injured (Makoye, 2012). These kinds of conflicts are also happening in other parts of Africa with similar conditions. For example Mamdani (2008) showed that, in Darfur, conflicts between pastoralists and agricultural communities escalated into a war which led to the death of about 300 000 people. Similarly, one interviewee explained that:

> "....*In 2004, pastoralists killed a farmer who was guarding his farm from being grazed on by livestock which were grazing around the farms. When he stopped the livestock, pastoralists who were grazing them killed him and threw his body into the Indian Ocean*..... " (Key Informant Interview, Muhoro, 25th January 2014).

Conflicts between the pastoralists and crop farmers are the most frequent reported conflicts in the study area. The causes of these conflicts as mentioned by the respondents included; pastoralists invasion of local people's crops and farms for grazing, pastoralists refusing to pay compensation for the loss of crops and pastoralists not observing boundaries of the demarcated grazing lands; as they sometimes tend to encroach into local people's farms. These findings provide useful insights to policy and decision makers to understand the core or nucleus of the conflicts while addressing land use conflicts between the two sectors. The findings are in line with those of Mann and Jeanneaux (2009) who described that the debate over rural land use often hinges on disagreements about societal values and preferences, resulting in conflicts that take place on the local, regional, national, and international levels, bearing enormous social costs. Tolossa and Baudouin (2004) described that one of the cause of conflicts between farmers and pastoralists is access to natural resources; in this case land resource is considered. Other studies

demonstrated that the growth of the livestock population led to increased movement of large herds of livestock to areas which traditionally had few livestock, such as Mbeya, Iringa, Morogoro, Rukwa and Coast Regions, creating serious land use conflicts (URT, 1997; Sendalo, 2009).

4.4.3 Village leaders versus pastoralists conflicts

Respondents also reported that there are conflicts between village leaders and pastoralists. These kinds of misunderstandings occur when some pastoralists do not abide by laws and by-laws, especially when they are accused and obliged to pay compensation for the destroyed crops either in cash or in kind. They feel that they are being oppressed and marginalised. They do not trust village authorities hence leading to misunderstandings between them. The findings are in line with those of Ide and Fr`ohlich (2015) and HAKIARHI (2009) which indicated causes of land use conflicts in different places to include: weaknesses of the authorities in managing land use distribution, decline of land capacity in producing the required amount of produce and populations increase resulting in scarcity of productive lands. Thebaud and Batterbury (2001) also pointed out that the recurring land use conflicts are caused by decreasing efficiency of conflict management mechanisms. The findings imply that among the significant reasons for land disputes prevalence in the study area is lack in place mechanisms for regulating or preventing land use conflicts, through district and village authorities.

4.4.4 Conflicts between Villagers and village authorities

The study was also informed about the incidences and existence of conflicts between the village authorities and the villagers themselves. The cause is that the village leaders who are accused of being bribed in situations where pastoralists are accused to have destroyed local people's farms and their crops. It was described that village leaders tend to make

biased decisions in favour of pastoralists. Leaders are also blamed of not taking serious measures on critical matters, especially land related issues. They are also suspected of being involved into bribery acts. According to the respondents, bribe forces leaders to be biased in favour of pastoralists when deciding on allegations brought before them. Benjaminsen and Ba (2009) studied the role of policy and corruption in explaining farmer–herder disputes in the inland delta of the Niger River in Mali. The study findings and those by Benjaminsen and Ba (2009) and Benjaminsen *et al.* (2009) described the existence of corruption on matters related to farmer-herder conflicts in the study area and other areas with the same situation. The respondents complained that leaders are bribed by pastoralists who are termed as richer people than the local people.

4.4.5 Local people and pastoralists versus investors conflicts

The study was also informed that there were conflicts between villagers and pastoralists on the one hand versus investors on the other hand. There are investors coming in the areas to look for land for investing. The villagers welcome them and, through village meetings, all the village members agree on the size of land to be awarded following the procedures stipulated in the *Village Land Act 1999* and *The Rural Farm Lands (Acquisition and Regrant) Act 2002*. But during the allocation of the agreed land size and location, leaders are the ones who are responsible. The respondents reported the allegations that on the day of land allocation the investors tend to bribe leaders so that they are provided with more land than what has been approved by village members. In Nyamwage village it was pointed out by participants that:

> *"...there are new comers other than pastoralists who come in the name of investors who also acquire land for various purposes...they are allocated land for their various purposes by the village leaders who sometimes do not observe procedures*

for land allocation.... " another participant added: "*...these so called investors have increased the land use problems by not only quarrelling with the local people but also with pastoralists...* " (FGD, Nyamwage, 14th January 2014).

This means that investors were also accused of encroaching into areas allocated for pastoralists. These statements indicate that there are other in-migrants apart from pastoralists who have also been involved in land use disputes in the study area. It appears that village leaders do not adhere to the decisions made during village meetings on the size of land agreed to be allocated. This leads to conflicts between villagers and investors as well as between pastoralists and investors.

The finding are in line with what was reported by PINGOs (2013) who reported that, in the district, Mkiu Poultry Farm Limited from Dar es Salaam was given land by the village authorities more than the size authorized by village members. It was allocated 1486 hectares for poultry keeping and agriculture in Ngorongo East and 540 hectares in Ngorongo West. This land was also allocated to pastoralists from Ihefu in 2006 (double allocation problem). This resulted in conflict between the investor and the pastoralists. The findings imply that there are policy implementation weaknesses, government laxity, and corruption among leaders which lead to conflicts outbreaks between farmers and pastoralists. When respondents were asked to list investors and other institutions with land in the village, they also listed the Rufiji Basin Development Authority (RUBADA). RUBADA was also blamed to take part of village and local people's lands in the name of river basin protection. The study was informed that the RUBADA workers sometimes use force to take villagers out of the so called protected lands, and this sometimes leads to misunderstanding between the parties.

4.4.6 Inter-villages and intra-villages conflicts

Findings show the existence of land use conflicts within village (intra-village conflicts) and between villages (inter-village conflicts). According to the respondents, these conflicts have been there even before the arrival of pastoralists. The intra-village land use conflicts are due to misunderstandings on the farm land boundaries among the villagers. Inter-village conflicts are caused by the absence of surveyed village lands. During an interview one of the key informants described that:

> *"..there are land use conflicts between one village and another because of misunderstanding on the village land boundaries...Muyuyu Village had land boundary conflicts with a neighbouring village....but through the land use committee and with the help from the district authorities they had resolved the problem, and they are in a harmonious situation....."*(Interview, Muyuyu, 16th January 2014).

The statement shows that the clashes between villages as caused by the misunderstandings on the village boundaries are also common and also they are resolved using the properly arranged techniques within themselves.

Intra-village conflicts also entail those between families within the village. These conflicts are categorised by the presence of the pastoralists. These findings are also supported by those reported by Mbonile and Mwamfupe (1997) who found that in-migrant pastoralists and agro-pastoralists in Usangu plains have sparked up land and water use conflicts among many user groups including the conflicts among the villagers themselves.

One interviewee in Kiwanga village pointed out that:

> "*...there are natives selling pieces of land to the pastoralists without any consultation and agreement with other family members...this is especially happening in areas where owners have been outside the village for a long time, when they come back and find their inherited land has been sold to the pastoralists by their relatives, as a result, family conflicts arise...*" (Interview, Kiwanga, 22nd January 2014).

The quotation implies that there are also family land conflicts in the study area as some family members try to sell their lands without involving fellow family members.

4.4.7 Conflicts between pastoralists and agro-pastoralists

It is rare to find literature on the conflicts involving pastoralists and agro-pastoralists. In most cases the commonly reported land use conflicts are those between pastoralists and crop producers, for example those reported by Mwamfupe (2015), Makoye (2012) and Benjaminsen *et al.* (2009). Basically, both pastoralists and agro-pastoralists are new comers to Rufiji district with the purpose of looking for places (land) where to graze their livestock and to undertake crop cultivation. One group practices only livestock keeping (pastoralism) and the other undertakes livestock keeping and crop cultivation (agro-pastoralism). This misunderstanding is caused by pastoralists feeding their livestock on the farms belonging to both agro-pastoralists and those belonging to local farmers. It was further described that pastoralists and agro-pastoralists themselves sometimes fight for pasture lands as well as for water sources as they attempt to feed their livestock. It was articulated by one female FGD discussant at Kiwanga village that:

"....it happened in 2013 in the village where the group of pastoralists' cattle entered one of the agro-pastoralist farm and destroyed crops in the farm...this prompted a fight and misunderstanding between the agro-pastoralists and the pastoralists...but it was settled by the pastoralist paying for the loss to the agro-pastoralist crops...." (FGD, Kiwanga, 23rd January 2014).

The statement reveals the existence of conflicts between pastoralists and agro-pastoralists in the study area.

4.5 Conflict Management Techniques

Various techniques have been established to reduce occurrence of conflicts in the study area. All the respondents acknowledged being aware of the techniques, which implies that they are also recognized by community members. The ranking in Table 4.2 shows that the most popular technique was the frequent meetings with pastoralists' leaders (84.5%). Other techniques include application of by-laws, valuation of loss, reporting to the police and cases opened at the primary court, conflict mediation between conflicting actors, involvement of pastoralists and village elders in conflict resolution and evacuating pastoralists out of the village. In a FGD at Muhoro it was said that:

"...in solving conflicts between families after one member has sold a piece of land without informing other family members we mediate the involved parties....the relatives may decide to refund the buyer the amount paid to the seller and the buyer agrees on the refunded money.....the relatives are able to refund the buyer after negotiations. This is because, in most cases, the sold piece of land is sold at a peanut price amounting between Tanzanian shillings 300 000/= and 1 000 000/=..." (FGD, Muhoro, 27th January 2014).

This quotation shows that there are indeed locally applied conflict mediation techniques between the conflicting parties which work properly in the process.

Table 4.2: Conflict management techniques in Rufiji District (n=200)

S/No.	Land Conflict Management Techniques	Percent (%) Responses	Rank
1.	Villagers meeting with pastoralists	84.5	1
2.	Application of village by-laws	71.5	2
3.	Evacuating pastoralists out of the village	52.5	7
4.	Conflict mediation between conflicting parties	56.5	5
5.	Involvement of elders in conflict mediation	54.5	6
6.	Police and open case to the primary court	58.5	4
7.	Evaluation of loss caused by identified damages	61.5	3

One participant from Muyuyu argued that :

> *"...farmers' complaints are always ignored by the police because pastoralists are bribing officers every time a complaint arises.....the government should have made proper land allocation before allowing pastoralists to enter the villages".*

The uses of the police and the primary court were criticized to associate with lack of transparency among stakeholders hence leading to corruption.

Moreover, farmers claimed that such conflicts have already been reported to relevant authorities, but without any solution. For example, one farmer said:

> *"...Pastoralists are grazing in our fields without any compensation for the destroyed field produce..."* (Interview, Muyuyu, 16th January 2014).

This quotation means that there are sometimes problems of pastoralists feeling they are above the laws regarding land use management.

Another respondent in the interview in Kiwanga village explained that:

"....pastoralists have been very reluctant to pay for the compensation of the loss caused by the livestock invasion into farms.....this is because they are sure that if the case is taken to the police they will bribe the policemen and the case will automatically be resolved; as a result we (farmers) lose our rights...." (Interview, Kiwanga, 22nd January 2014).

These findings were also noted by Mahmoud (2011) who described that state-led peace making initiatives often fail due to corruption, lack of legitimacy, low resources and ultimately institutional weaknesses.

The technique of evaluating the loss caused was done in a manner that pastoralists are required to pay for the loss identified. The evaluation is normally done by both (farmers and alleged pastoralists) and the estimated costs are paid. The payments are in terms of cash or in kind, based on the estimated number of bags expected to be harvested in a farm. Dawwas (2014) appreciated the role of various techniques in land use conflicts including the multiple land use planning as well as the use of Geographical Information Systems (GIS). But when it happens that pastoralists fail or decline paying for the loss there are chaos caused to farmers. One of the focus group participants in Kiwanga village appealed that:

".....when we find cattle in the farms or find them without anyone looking after them we take and detain them (Plate 4.3)*...owners are fined 50 000/=Tsh. (fifty thousand) for such an offense...then in detention villagers community security (locally known as "walinzi jamii") take care of the cattle. If the detained cattle spend a night, they are charged 5000/=Tsh. (five thousand) per cattle for every night spent..."* (FGD, Kiwanga, 23rd January 2014).

Plate 4.3: Groups of cattle detained for grazing in the natives' farms.
Source: PINGOs (2013)

4.7 Stakeholders Involvement in Conflict Management

The study undertook an analysis of the stakeholders involved in conflicts management. This analysed the sustainability of the measures taken to address land use conflicts. The respondents were required to identify the stakeholders and their roles. Patel *et al.* (2006) argued that stakeholders do not necessarily participate all at once at a time, but community participation in resource use planning has been undertaken in a variety of settings and has been successful in reducing resource use conflicts.

It was described that stakeholders' involvement depends on the magnitude (to what extent has the conflict spread), level and stage (conflicting parties and actors) of the conflicts. The stakeholders include, among other; pastoralists leaders, ward officers, police officers, district officers, farmers, village leaders, elders (pastoralists and farmers), and regional officers. Mann and Jeanneaux (2009) described the importance of involving leaders, conflict victims and possible source personnel in conflict resolution. Table 4.3 shows the roles of every individual or group of stakeholders. The study realized that all the stakeholders have valuable and very important roles over the reduction of land conflicts in the district. In an FGD at Muyuyu Village, participants explained that:

> *"....district officers attend meetings when there are grievances, but it also happened one day the regional commissioner came in the village and resolved the issue...but there are problems of some of the pastoralists not attending meetings when they are called...* " (FGD, Muyuyu, 18th January 2014).

Another respondent articulated that:

> *"...when actors meet to discuss in detail about the occurred disputes they sometimes come with a long-term solution for that particular causal effect.... these actors include the pastoralists, farmers, village council members, elders and Ward Executive Officers who act as mediators to the groups which are in conflicts.....in the meetings during the negotiations fair and active participation is always considered whereas all participating stakeholders are given equal chances to express themselves concerning the existing issues...*" (Interview, Muhoro, 25th January 2014).

This quotation implies that the stakeholders are aware on existing land use problems and they take into concern as they meet to discuss their solutions.

Table 4.3: Stakeholders' roles on land use conflict management

Stakeholders	Roles and functions in land use conflict mediation
Pastoralists	• Participating in village meetings • Participating in mediation meetings
Farmers	• Participating in village meetings • Participating in mediation meetings
Pastoralists leaders	• Participating in mediation meetings • Enforcing laws and by-laws
Village leaders	• Call village meetings • Participating in village meetings • Call for conflict mediations • Enforcing laws and by-laws
Pastoralists and village elders	• Participating in mediation meetings
Police officers	• Enforcing laws and by-laws • Taking matters to the court • Taking strikes at ease
District officers	• Translating land use plan map • Take part where village level mediation has not been resolved • Enforcing laws and by-laws
Regional officers	• Take part where district level mediation has not been resolved
The primary court	• Translating laws and by-laws and ensuring equal rights

4.8 Theoretical Contribution of the Study

The study was guided by the social conflict theory. The central theme of conflict theory is the unequal distribution of scarce resources and power as causes of resource use conflicts. However, the theory did not consider the migration aspect which in fact accelerates social conflicts among societies as far as scarce resources (for example land) are concerned. In this study findings, therefore, the migration dimension has been added in the analysis of social conflicts related to land uses. The study has shown the existence of various actors (classified) in social conflicts with different interests of their existence which were also lacking in the theory. Finally, the findings came up with social conflicts mediation techniques as described by Dahrendorf (1959), Simmel (1969) and Aubert (1963).

4.9 Conclusion and Recommendations

This paper addressed the specific objective number three of the thesis which was to examine the extent of land use conflicts escalations in the study area. In this regard the study was responding to the related question addressing the extent to what land use conflicts had been escalating as a result of pastoralists' in-migration in the study area.

In order to have sustainable and peaceful land use management in both sectors of the economy (crop production and livestock keeping), then there must be deliberate action and decision in solving these existing land conflicts. It should be borne in mind that land is the key source of development of all the other sectors, but this cannot be attained if the prevailing land conflicts will not be solved immediately.

The findings show that land use conflicts were common before the arrival of pastoralists. However, during this study increasing numbers and types of actors involved in conflicts were observed. The evidence on land use conflicts in Rufiji district shows that indeed land use conflicts existed even before the arrival of pastoralists. To date they are still prevailing, caused and steered by the arrival of pastoralists.

The Rufiji District case of land use conflicts between various parties illustrates that the in-migrant pastoralists have caused the increasing number of conflicting actors. This is due to the fact that the natives showed to have not experiencing the conflicts between pastoralists and agro-pastoralists. The study has also showed that the traditional (local) participatory conflict management and resolving techniques can work better than the use of the government instruments like police and higher authorities. This is due to the complaints about corruption among government officials who are blamed to have been favouring pastoralists in decisions and ignoring natives' rights, government authorities' ignoring village agreements, and pastoralists refusing to pay compensation to the farmers for destroyed crops on farm.

It is recommended that relevant and responsible authorities (village to national levels) should make sure that the existing land use conflicts are settled by establishing appropriate policies and resolution techniques. This can be done by ensuring the involvement of all

land use stakeholders. It is also recommended that decision makers should incorporate a diversity of actors' interests to handle conflict and thus to improve land-use planning and management decisions. This can be done through the use of well-established village land use committees and ward land committees who will help to control the outbreak of such conflicts.

The study calls upon all land users (beneficiaries) like pastoralists, agro-pastoralists, crop producers (farmers) and other investors in the study area to have respect to one another. This calls for all of them to respect the value of one another, not only that but also the government (village and district levels) treat all the stakeholders equitably, especially in making decisions related to land uses.

It is further recommended that the village, district and the ministry of livestock responsible authorities should make sure that pastoralists are provided with necessary infrastructure like cattle dips and their needs so as to reduce unnecessary movements which make them to invade the prohibited areas.

The study recommends for the need to the provision of education to all citizens, especially on land laws and by-laws available in Tanzania and in the study area. This can be done by all stakeholders including the government itself, Community Based Organization (CBOs), Non-governmental Organization (NGOs) as well as through established Civil Society Organizations (CSOs). This should go together with efforts to strengthen land disputes settlement organs, especially those at the village level to the district level.

Finally, the study recommends that the arrival of pastoralists should not be taken to have only negative implications, but also there should be efforts to derive constructive aspects

to the host communities. Leaders should observe and respect village agreements, regulations and procedures of village land allocations as stipulated in the Village Land Act 1999.

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CHAPTER FIVE

5.0 The Impact of In-migrant Pastoralists on Livelihood Outcomes of the Local People in Rufiji District, Tanzania

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Target Journal: Journal of Co-operative and Business Studies (JCBS)

5.1 Abstract

The concept of livelihood is about individuals, households or groups making a living or attempting to meet their various consumption and economic necessities. Livelihood in many rural areas of the world is complex, dynamic and poses a lot of human life outcomes. Perhaps it is only the day-to-day uncertainty of survival that remains to be constant. In this paper we examine the local people's livelihood challenges as caused by in-migrant pastoralists in Rufiji District, Tanzania. Data were collected using questionnaires which were administered to 200 respondents in five villages. Data analysis involved generation of descriptive statistics for quantitative data and use of content analysis for qualitative data. Multiple linear regression was used to determine the impact

of in-migrant pastoralists' characteristics and natives' livelihood outcomes. The findings showed that 69.5% of the respondents reported that there were livelihood challenges which had resulted from the arrival of pastoralists in the study area. Further, from the model, out of the eight factors analyzed, four of them were found to have statistically significant impact ($p \leq 0.05$) in affecting local people's livelihood outcomes. The four factors were: newly introduced economic activities ($p \leq 0.05$), presence of investors ($p \leq 0.05$), new agricultural systems and techniques introduced after the arrival of pastoralists ($p \leq 0.001$) and change in land uses ($p \leq 0.05$). Among these, only land use change had negative influence on the livelihood of native communities while the remaining three showed positive influence. The other four factors showed statistically insignificant influence. The study concludes that the livelihoods of the local communities have been affected by the coming of the pastoralists. The study recommends that there is a need for relevant stakeholders, working as inter-sector teams, to strengthen the identified positive livelihood effects and take all negative effects as challenges for improvement.

Key words: livelihood, livelihood outcomes, pastoralism, agro-pastoralism, local people.

5.2 Introduction

Pastoralism is an ancient form of human activity, and present-day pastoral people carry forward an array of diverse cultures, ecological adaptations and management systems that have changed with modernity. Pastoralists in Africa are classified as indigenous people, as long as they are culturally different from the rest of the population (IUCN, 2011). Pastoralism is one of the agricultural production systems in the continent. Sub-Saharan Africa is home to more than 25 million pastoralists whose livelihoods depend on mobile livestock keeping and over 200 million agro-pastoralists who combine mobile livestock keeping with crop cultivation (SNV, 2012). Pastoralists and agro-pastoralists represent

over a quarter of the total population in Africa and occupy 43% of the continent's total land mass (SNV, 2012). Pastoralism and agro-pastoralism represent the traditional herd owned by small scale farmers and account for 98% of total cattle herd in Tanzania (Mlote *et al.*, 2013). Both pastoralism and agro-pastoralism production systems have been increasing at a rate of more than 2% per annum and supply more than 95% of the meat and 70% of the milk consumed in the country (Njombe and Msanga, 2008).

Pastoralism is a dominant life form and production system in semi-arid parts of Tanzania. In these areas, livestock production contributes to sustainable livelihoods and security of the rural poor. It exploits natural resources including rangelands and pasture to generate food and other goods such as meat, milk, and hides, and financial resource cash, savings, credit, insurance, gifts, and remittances. Through these ways, social resources (traditions, prestige, identity, respect, friendship, marriage dowry, festivity) are promoted and sustained (Yanda and William, 2010). One of the characteristics of pastoralism in Tanzania and elsewhere is that of migration. Pastoralists who have their origin in the northern parts of Tanzania (Markakis, 2004) have migrated to even other regions of Tanzania which had no pastoralists before. For example, after a number of years of migration, the pure pastoral Maasai and Barbaigs from the northern parts of Tanzania and, Sukuma agro-pastoralists from the lake zone are eventually found in the southern highlands and southern regions of Tanzania after taking different routes. Such in-migration undoubtedly creates livelihood-based influences to the communities in pastoralists' destination areas.

The concept of livelihood is about individuals, households or groups making a living, attempting to meet their various consumption and economic necessities, coping with uncertainties and responding to new opportunities (De Haan and Zoomers, 2005). Ellis

and Freeman (2004) explained that a livelihood comprises assets (natural, physical, human, financial and social capital), activities, and access to these (mediated by institutions and social relations) together determine the living gained by the individual or household, thus influencing livelihood outcomes of that individual or household.

According to Carney (2003), livelihood outcomes are achievements of livelihood strategies such as income levels, well-being, vulnerability levels, food security, and access to natural resources. Hansen and DeFries (2004) described that human well-being (including livelihoods) may be affected either positively or negatively by various changes and with intended and unintended consequences, which may potentially enhance and/or erode the benefits and economic gains derived from such changes.

Tanzania is experiencing pastoralists' migration from their traditional grazing areas or from other areas where they formerly in-migrated for pastoral activities but which have previously been used solely or predominantly for crops production. One of such areas is Rufiji district. In-migrant pastoralists were first seen in Rufiji District in the year 2000, and a big influx was observed in 2007 following pastoralists' eviction from Kilombero District, Kilosa District and Usangu basin in Mbarali District by government order through the office of the Vice President (Walsh, 2012; Mvulla and Kawawa, 2006). According to Mwilawa (2003), it is estimated that in that period the district had about 5000 herds of indigenous cattle of which 4000 were from in-migrant pastoralists, 300 dairy cattle, 7000 goats, 1000 layer chickens and 400 000 local chickens. There are no clear records of the exact number of pastoralists and agro-pastoralists that have entered the district before and after the eviction order.

The advent of pastoralists among the peasants community induced various changes. Social and economic networks between the two groups increasingly became so complex with their economic interests becoming so interlinked despite various conflicts between them. According to Bianco (2006), exchanges between agro- pastoralists and agricultural communities have been instrumental not only in satisfying the growing need for food, but also income for both populations. The author also noted the potentiality of barter trade between the two communities as well as exchange of mechanisms for starch based staples such as cereals grains for milk and meat. IMM *et al.* (2005) noted that awareness of local markets and the role they play in the viability and sustainability of new livelihood strategies becomes relatively good through inter-sector linkages created by in-migration, although too many people become involved in new or same activities thereby creating competition and even conflict. In this case, therefore, each group has a reason to be interested in the well-being and functioning of the other because of the various factors which cause the inter-linkages to exist.

Several previous studies on pastoralists' migration (for example; Maswaga, 2013; Mvulla and Kawawa, 2006; Markakis, 2004; Ngailo, 2011; Ngailo, 2013) revealed that the in-migrants have a fully mobile livelihood strategies which in turn influences local people's communities' livelihoods. Still there is a need for scholars to establish the nature and consequences of such linkages to the livelihood of the local communities among which in-migrants settle because of the limited information in the literature. However, this has not been well established, specifically in Rufiji District. The main objective of this paper was to analyze the coming of pastoralists in Rufiji District and its impacts on the livelihoods of the local people. Specifically, the paper identifies livelihood outcomes among the natives as triggered by the coming of pastoralists. The assumption made in this study is that the

coming of pastoralists in the area has affected local people's livelihood outcomes either negatively or positively.

The study was guided by the Boserup (1965) theory who explored the role of population as an independent variable that influences both the development of agriculture and technology which, in turn, shapes the productive capacity of resources, not only positive attributes but there are also negative ones. Boserup seems to be biased only on the positive directions of population growth influences. Boserup stressed the potential catalyst effects of population growth on agricultural and other technologies, resulting in intensification of the agricultural systems. Boserup argues that intensification is an induced response to population growth. She argues that increasing population pressure provides a primary stimulus for innovation and intensification. Therefore, the Boserupian model suggests that population pressure stimulates innovation, and agricultural intensification leads to reduced fallow and technical change.

This study makes use of the idea from Boserup and argues that pastoralists' in-migration into the study area has caused population increase, and this has had various direct and indirect effects on the livelihoods of the local communities. In this case the increased population in the area is assumed to have brought positive and negative effects to the local people's livelihoods. This is due to the fact that Boserup did not make clear what driver of population growth was responsible between migration and natural increase. Her arguments also were based only on agricultural innovations without considering other attributes including the negative ones that may change as a result of population growth.

5.3 Methodology

5.3.1 The study area and design

This paper is based on a survey study that was conducted in Rufiji District. The study area was chosen because of its historical backgrounds of pastoralists activities. First the district was formally not experiencing and influx of pastoralists since before 2000s so it was necessary to understand the existing variations after the pastoralists' arrival. Secondly, it is among the areas identified by the government to receive pastoralists and agro-pastoralists evicted from Mbarali, Kilombero and Kilosa Districts since 2006 and it received a large number of livestock and livestock keepers than any other districts in the Coast Region. A cross-sectional research design which allows the collection of data once at a time was applied during the study.

5.3.2 Sampling and data collection

Five (25%) out of 20 villages which received pastoralists were selected. The k^{th} factor formula was applied to pick the sampled villages. The total of 20 villages which received pastoralists was subjected to the formula. To get the first village, the sampling fraction was used; other villages were selected basing on the fourth village which the fraction obtained. Bailey (1994) argues that a sample of 30 respondents is the bare minimum for studies in which statistical analysis can be done regardless of the population size. Basing on the purpose of the study, the sample size of 200 respondents was adequate. The respondents of target were those of at least 30 years of age in 2013-2014 and must have lived in the village since or before 2000. Data were gathered by administering a questionnaire, while a checklist of items was used during interviews and FGDs. Both qualitative and quantitative data were collected.

5.3.3 Data analysis

Content analysis was used for qualitative data analysis whereby data were summarised by their themes, and comparing and contrasting arguments given during interviews and discussions. Descriptive statistics were used to analyse quantitative data. Multiple linear regression was used to test the null hypothesis that the arrival of pastoralists in Rufiji District do not have significant impacts on livelihood outcomes among the local people. The model was used to determine the impact (negative and positive) of the independent variables on the natives' livelihood outcomes at both household and community levels.

The livelihood outcome was measured by developing a livelihood outcome index. The index assessed whether the local people respondents were able to build modern houses (iron sheet roofed and cement blocks constructed houses), change agricultural production systems and techniques, improve food security, involved in resource use conflicts, adopted newly introduced cash and food crops, engaged in production of newly introduced livestock, prepare village sustainable land use plans, increase and improve sources of income, improve access to social services, witnessed an increase in population and growing social interactions. The response weights were yes = 1 and no = 0. Thereafter, each livelihood outcome was assigned points, and all the points were added up to get the overall scores on livelihood outcomes. The overall scores ranged from 0 to 11 attainments as measured using the total number of livelihood outcomes.

Before running linear regression, the independent variables and the dependent variable were checked for normality by determining their normal curves, which were then checked visually to find whether they were normally distributed. Checking normality was done because linear regression requires all variables to be normally distributed across the sample. Pallant (2005) emphasizes that any variable that does not have a normal

distribution should be transformed into a normal distribution. All the variables were found to be normally distributed; therefore they were not transformed.

All the independent variables were also checked for multicollinearity. Multicollinearity is an undesirable condition whereby two or more pairs of variables have so much linear relationship that inclusion of both variables reduces the quality of the results (Pallant, 2005). Multicollinearity was checked by computing Variance of Inflation Factors (VIFs) and tolerances of independent variables during regression analysis. Mela and Kopalle (2002) explained that the VIF is a more rigorous check for collinearity than the correlation coefficient. The VIF of an explanatory variable measures the inflation of the variance of the variables' regression coefficients relative to a regression where all the explanatory variables are independent. VIFs are inversely related to tolerances with larger values indicating involvement in more severe relationships. According to the rule of thumb, VIFs above 10 or tolerances below 0.1 are seen as a cause of concern (Landau and Everitt, 2004). All the tolerance values of collinearity which were greater than 0.1 and VIF values of collinearity which were less than 10 show that there was no multicollinearity. The multiple linear regression model used to test the hypothesis was specified as follows:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + \ldots\ldots b_8x_8 + e$$

Where:

Y= total number of natives' livelihood outcome attainments (continuous variable)

a =Constant or Intercept of the equation

$b_1 \ldots b_8$ = Regression coefficients,

e = Error term representing a proportion of the variance in the dependent variable that was unexplained by the regression equation.

X_1 = New economic activities, X_2 = Number of years a pastoralist has lived in a village, X_3 = Number of received pastoralists, X_4 = Presence of investors, X_5 = New agricultural systems and techniques, X_6 = population change, X_7 = Change in land use, X_8 = Availability of market facilities and services.

5.4 Results and Discussion

5.4.1 Pastoralists' challenges and impacts on the local people's livelihood

The findings in Table 5.1 indicate that 69.5% of the respondents reported the emergency of livelihood challenges which they associate with the arrival of pastoralists whereas 30.5% reported that there were no challenges. The challenges mentioned included: prevailing conflicts, emergence of new businesses, destruction of crop farms, cultural interactions and local people's land invasion. Furthermore, 55.4% of respondents reported that the challenges were positive (like introduction of new food and cash crops) while 44.6% said that the challenges were negative (like destruction of crops in the farms). By positive means that the challenges had been advantageous to the livelihoods of the local people while the negative response means there were disadvantages after the arrival of pastoralists in the area. These were also observed by Mwambene *et al.* (2014) who did a study in Ruvuma and Lindi Regions about livelihoods challenges of the Ihefu evicted pastoralists and found that the coming of the pastoralists had positive and negative challenges on the livelihoods of both the local people and the new comers themselves. The authors also revealed that pastoralists brought such issues like resource use conflicts, land degradation, improved milk and meat, and availability and increased social interactions among the new comers and the local people in the regions.

Table 5.1: Distribution of responses on livelihood challenges

Presence of livelihood challenges (n=200)	Frequency	Percent
Yes	139	69.5
No	61	30.5
Livelihood challenges position (n=139)		
Negative	62	44.6
Positive	77	55.4

The variations in the responses on the livelihood consequences from people of the same place are due to non-homogeneity livelihood conditions among the respondents. It is most likely that those who responded that pastoralists' arrival has disadvantageous implications are those whose livelihoods were mainly based on crop production and those who responded to have experienced advantageous influence were those whose livelihoods depended on fishing and business vending. This is because some of the pointed out problems were destruction of crops by livestock and occurrence of conflicts between pastoralists and crop producers. This was also pointed out by Mwamfupe (2015) and Makoye (2012) that among the negative impacts of the in-migrant pastoralists in Rufiji District is the prevalence of land use conflicts. Another challenge is the existence of corrupt leaders. Respondents mentioned increased corruption among village leaders. In the FGD at Nyamwage village, it was said:

> "*.....Leaders are sometimes making decisions which are in favour of pastoralists when we bring our complaints concerning their livestock invading our farms and destructing of our crops...this is because they are bribed by the pastoralists so that they make decisions in favour of them...*" (FGD, Nyamwage, 14th January 2014).

This statement reveals that corruption has been a challenge, especially on matters related to farm invasion by livestock whereby accusations of the local people against pastoralists are judged in favour of the pastoralists.

However, the advantages are related to business vendors and fish hawkers as well as crop producers. These include: improved food security, emergence of new business opportunities, availability of meat and milk, introduction of ploughing techniques and the use of oxen for land cultivation. It was also mentioned that pastoralists have been involved in a variety of livelihood strategies, unlike the local people. This becomes a catalyst to the local people to learn more from the newcomers on various livelihoods. These findings are supported by Omondi *et al.* (2008) who described about the livelihood and food security among the immigrants and receiving communities at Kajiado count in Kenya. One elder at Muhoro village said :

> "....*since we started receiving pastoralists, we have advantages like eating beef and drinking milk..... we hire their bulls for land cultivation which makes farm preparation to be faster than the use of the hand hoe.....it is true that they destroy our crops in the farms and sometimes fight with us.... but we cannot complain that we have not benefitted from them....*" (FGD, Muhoro, 27th January 2014).

This suggests that, when pastoralists enter an area, the receiving communities either benefit or lose from their presence. The farmer's statement also implies that there are such kinds of food security in terms of the increased varieties of food they take as introduced by the new comers.

Furthermore, the introduction of new food crops and cash crops was mentioned as one of the positive impacts of the pastoralists' arrival in the area. Formerly, local people were not producing crops like sweet potatoes, sorghum, green pigeons and millet, but the coming of the agro-pastoralists has influenced them to produce such crops for both consumption and for the market when they have been produced in surplus. It was also mentioned that agro-

pastoralists have introduced crops like sweet potatoes and new land management practices like ridging because potatoes are mainly grown on ridges. This has contributed to adoption of new agricultural practices by native communities. Findings by Mbonile and Mwamfupe (1997) in Usangu plains also showed that in-migrant pastoralists may have led to the introduction of new crops and the strengthening of small-scale cultivation. Ridge farming was uncommon in the study area before the arrival of agro-pastoralists. These findings support Boserup's idea (1965) that population increase leads to improved innovations.

Table 5.2 presents the most common livelihood outcome attained as experienced by the local people in the study area. The results show that the most common livelihood outcome is the occurrence of resource (land use) conflicts (10.8%), followed by the introduction of new crops (9.5%) and followed by the introduction of new livestock (9.3%). The new livestock include donkey and bulls for farm tilling and carrying farm products. The lowest noted experienced livelihood outcome challenge was the growing social interactions (8.5%). Other livelihood outcomes as identified from this study include: construction of modern houses (iron sheet roofed and cement blocks), establishment of village sustainable land use plans, introduction of new sources of income, population increase, change in agricultural systems and techniques, increased access to social services and improved food security. The findings are similar to those by Maswaga (2013) who found that in-migration of pastoralists contributed improved food security, increased availability of meat and milk, and growing in social interactions among them and the native farmers. The results imply that the most detrimental livelihood outcome challenge is the land use conflicts occurring between various parties in the study area.

Table 5.2: Livelihood outcomes experienced by the local people (n=200)

Livelihood challenges	Number of responses	Percent	Rank
Resource use conflicts	152	10.8	1
Introduction of new crops	134	9.5	2
Introduction of new livestock	131	9.3	3
Improved food security	127	9.0	4
Change of agricultural systems and techniques	125	8.9	5
Construction of modern houses	125	8.9	5
Improved access to social services	124	8.8	6
Preparation of sustainable land use plans	123	8.7	7
Improved and increased sources of income	123	8.7	7
Population increase	123	8.7	7
Growing social interactions	119	8.5	8
Total	**1406**	**100.0**	

5.4.2 Livelihood outcomes among the local people

The findings show that the mean score of the livelihood outcome after the arrival of pastoralists among the local people was found to be 6.2, which were at the high level as the moderate mean score was 6.0 (Table 5.3). The findings furthermore indicated that 49.5% had high level of livelihood outcomes, 28.5% had moderate livelihood outcomes and 22% were found to have low livelihood outcomes as a result of the coming of pastoralists in the study area. The results imply that, generally, the local people in the study area could be categorized in high livelihood outcome level due to the influence from in-migrant pastoralists. Nevertheless, the study did not establish the baseline livelihood outcome level among the local people before the arrival of pastoralists in the study area; this makes it not possible to conclude from the findings that the current livelihood situation is either at an improvement level or otherwise. The findings are in line with those by Bianco (2006) who found that peoples' livelihoods can be better because of social and economic interactions between the pastoralists and agricultural communities. Such interactions, among others, can increase the demand for food as well as income for both communities. These findings are confirmed by those indicated in Table 5.1 whereby

55.4% of the respondents stated that the coming of pastoralists in Rufiji district has resulted into positive impacts on the livelihood outcomes of the local people in the area.

Table 5.3: Livelihood outcome score as influenced by pastoralists (n=200)

Level of livelihood outcome	Range scores	Frequency	Percent (%)
High scores	6.1-8	99	49.5
Moderate score	6.0	57	28.5
Low scores	1.0-5.9	44	22.0
Total		**200**	**100.0**

5.4.3 Pastoralists' impacts on the livelihood outcome of the local people

To determine the impacts of pastoralists on the local people livelihood outcome attainments at household and community levels, multiple regression was applied whereby β-coefficients were computed to obtain the directions and significance of the predictors as indicated in Table 5.4. The overall model fit containing all the pastoralists' effects was statistically significant ($p = 0.000$), indicating that the model was able to predict the impacts of pastoralists arrival on local people's livelihood outcomes.

The coefficient of multiple determinations (R^2) was 0.386 implying that the independent variables entered in the model explained only 38.6% of variance in the respondents' livelihood outcome effects. The results in Table 4 show that four (new economic activities, number of identified present investors, new agricultural systems and techniques and land use change) out of eight independent variables had a significant relationship with the local people's livelihood outcome effects in the study area while the other four were statistically insignificant at the 5% significance level.

Table 5.4: Pastoralists impacts on local people's livelihood outcomes (n=200)

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Independent variables	**B**	**S.E**	**Beta**	**t**	**Sig.**	**Tolerance**	**VIF**
(constant)	7.755	2.572		3.015	0.003		
New economic activities	0.737	0.327	0.157	2.256*	0.025	0.974	1.026
Pastoralist years in a village	-0.020	0.173	-0.008	-0.113	0.910	0.972	1.028
Received pastoralists	0.023	0.028	0.059	0.848	0.397	0.959	1.042
Presence of investors	0.879	0.372	0.033	2.317*	0.018	0.977	1.024
Agricultural techniques	1.859	0.512	0.251	3.629***	0.000	0.973	1.028
Change in population size	0.320	0.278	0.079	1.153	0.250	0.972	1.029
Change in land use	-1.448	0.652	-0.251	-2.484*	0.036	0.974	1.026
Availability of market facilities and services	0.036	0.055	0.045	0.651	0.516	0.996	1.004
R Square	0.397						
Adjusted R Square	0.386						
F ratio	3.930						

Dependent variable: Livelihood Outcome attainment score
Note: ***$p \leq 0.001$ and *$p \leq 0.05$

The results show that the number of newly introduced economic activities had a positive β coefficient (0.737) at $p \leq 0.05$ implying that the variable had a significant positive influence on the livelihood outcome. This is partly attributed to the fact that the majority (67%) of the respondents who were representing their households agreed to have experienced a number of new introduced economic activities, while 33% constituted the group of respondents who had not experienced and were not sure of the new socio-economic activities. The findings are in line with those by Maswaga (2013) who found that a positive influence of the coming of pastoralists can be found in Madaba, a small town in Ruvuma region with high business dynamics. The findings explain the importance of the economic activities introduced after the arrival of pastoralists or the establishment of economic activities by other groups, including the local people as influenced by in-migrant pastoralists.

In addition the presence of investors was found to have a positive β coefficient (0.879) and to significantly influence livelihood outcomes at $p \leq 0.05$. In the study area, it was explained that there had emerged poultry investors after the arrival of pastoralists and other investors who established small scale milk processing factories. There are also those who have invested in guest houses businesses. For example, Maswaga (2013) described that as a result of investors in Madaba Ruvuma Region who have invested in transport facilities and few in milling machines there is creation of investment opportunities in the area. This implies that the emergence of investors and consequent formation of socio-economic interactions with pastoralists and the natives impacts the natives' livelihood positively through, among others, introduction of various socio-economic activities and cultural opportunities like goods vending, attracting livestock products investors. These interactions create formal and informal employment opportunities among the natives. The results, moreover, imply that the more the investors come in an area and through their socio-economic interactions with the pastoralists and the local communities, the more the livelihoods of the local people are impacted positively.

The results further indicate that the new agricultural production systems and techniques had significant impact with a positive β coefficient (1.859) at $p \leq 0.001$. This implies that the variable substantially impacts the local people's livelihood outcomes. The new agricultural systems and farming technologies mentioned include ridges cultivation and the use of oxen and ox-plough for land cultivation. It was reported that the majority of the local people were not familiar with ridges cultivation and few managed to hire tractors for land cultivation before the arrival of pastoralists. Regarding the use of ox-ploughing technique in land cultivation, local people can now hire oxen, locally termed as "*maksai*" from the pastoralists who cultivate for them and hence fastening the land cultivation processes. One interviewee at Chumbi A said:

> *"...we normally hire them to cultivate our farms by using their oxen and ox-ploughs and in return we are paying them between Tanzanian shillings 50 000/= and 70 000/= per acre. The price is negotiable...but not all the natives can afford to hire the ploughs at that price; hence some still prepare their farms using the hand hoes.....* "(Interview, Chumbi A, 22nd January 2014).

This statement implies that there are benefits which are obtained by the local people as a result of the pastoralists' arrival in the area.

On the other hand, the results in Table 5.4 show that changes in land use had a significant negative β coefficient (-1.448) at $p \leq 0.05$. This implies that changes in land use by communities in the study area result in negative impacts to the livelihood. It was stated that there are new land uses like livestock keeping and introduction of new settlements in areas which were formerly not intended for those purposes. The land use change in the study area also included encroachment to protected land including forests and water sources. This implies that land which was previously regarded as farmland or protected land has now been turned into grazing and settlement land due to increased demand for pastureland and human settlements. This has resulted in invasion of water sources, thus influencing negatively the socio-economic transformation among the natives. These findings are similar to that by Walingo *et al.* (2009) who showed that there are land use changes at the slopes of Mount Kilimanjaro which included expansion of cultivation to more marginal land down the slopes, disappearance or extreme fragmentation of bush land and expansion of settlements.

Although it was mentioned that there are increased accessibility to market services and facilities as mentioned by respondents, this variable in the model had statistically

insignificant (0.516) impact on the livelihood outcome of the natives. These findings are contrary to the findings by Santiphop *et al.* (2011) who described factors affecting agricultural land use patterns and livelihood of farm households in Kanchanaburi Province, Thailand. The authors mentioned, among other factors, the market facilities (number of market centres and distance to the market centres) as factors having significant effects on people's livelihoods by either accelerating or hindering livelihood of the communities.In an FGD at Muhoro village, it was reported that:

> "*.....accessibility to market services has increased; the weekly cattle auction provides opportunities to sell our goods and access goods which formerly were sourced from distant areas away from the villages.....*" (FGD, Muhoro, 29th January 2014).

This quotation implies that, in the study area there has been emerging of newly established marketing centres hence enabling local people and in-migrants pastoralists to access services as well as selling their agricultural products and livestock products respectively.

5.5 Theoretical Contribution of the Study

The study was guided by the Boserup migration theory. The central thesis of the theory is an argument that *intensification is an induced response to population growth which is either occurring naturally or through migration processes*. The study has shown that in-migrants cannot only bring about innovations in the destination areas as suggested by Boserup, but also can bring changes to people's livelihoods. As far as this study is concerned, the changes can be both negative and positive. The findings have also shown that population growth in a certain area cannot only influence innovation (as a positive

attribute) as argued by Boserup, but also may lead to conflicts over existing resources in an area as a result of increased resource use demand.

5.6 Conclusions and Recommendations

The livelihoods of the local communities in Rufiji district have been transformed through influences from in-migrant pastoralists. These effects are on the aspects of the livelihood outcomes. The study focused on the direction these effects have taken (negative or positive) as well as on general pastoralists' factors affecting the livelihood outcomes of the local people. Indeed, the livelihoods of natives in the study area have been affected, and the effects are both positive (advantageous) and negative (disadvantageous). The knowledge generated through this study provides insights that can be used during formulation of appropriate interventions to improve the livelihoods of the local communities in the study area and in other areas in Tanzania with similar conditions. It is also concluded that apart from the challenges caused by pastoralists, there are potential opportunities that may arise from interactions between pastoralists and crops farming communities.

Based on the conclusions, it is recommended that there is a need for relevant stakeholders such as government agencies and non-governmental organizations at different decision making and operational levels to strengthen the identified positive livelihood effects caused by pastoralists, while the negative livelihood effects should be taken as challenges for improvement, especially in terms of making the best use of socio-economic opportunities that have emerged after the arrival of pastoralists. These may include encouraging the local people to engage in mechanised agriculture as well as in livestock keeping in a more environmental friendly and livelihood improving ways. The study also recommends the need for an inter-sectoral approach in dealing with challenges facing the

migrant pastoralists and the receiving communities in the destination areas whereby all stakeholders from various sectors should be included in the management and control of the pastoralists' migration as well as establishing properly planned receiving mechanisms for pastoralists in the destination areas.

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CHAPTER SIX

6.0 Summary, Conclusions and Recommendations

6.1 Summary of Major Results and Conclusions

This section presents a summary of the major findings in accordance with the study objectives. First, a summary of the major findings on the influence of in-migrant pastoralists on land use change is presented. In addressing the influence of in-migrant pastoralists on land use change in Rufiji district the section tested the null hypothesis which stated that the pastoralists' arrival in Rufiji District had no effects on land use change while at the same time describing the relationship and the extent of land use change with the presence of pastoralists in the district.

Secondly, a summary of the major findings on the effects of the in-migrant pastoralists to the socio-economic activities of the local people in the study area is presented. This is about the specific objective number two of this thesis whereby the main concern was to test the null hypothesis that the pastoralists' arrival in Rufiji district had no influence on the socio-economic activities of the local people. This dealt with examining the socio-economic effects of the pastoralists' arrival among the local people.

Thirdly, is the discussion on the land use conflicts escalation as an aftermath of the pastoralists' in-migration in Rufiji District. The section tells about the pastoralists' social effects and more specifically on the land use conflicts in the study area. This was the main concern of the specific objective number three of this thesis.

Finally, a summary of the discussion of the findings on the impacts of the in-migrant pastoralists on the livelihood outcomes of the local people in the study area is presented.

The main concern was to test the null hypothesis which stated that the pastoralists' arrival in Rufiji District had no significant impact on the livelihood outcome attainments among the local people.

6.1.1 Influence of in-migrant pastoralists on land use change

The influences of in-migrant pastoralists on land use are discussed in chapter two. The chapter analysed the land use changes which resulted from the coming of pastoralists as perceived and identified by the local people in the study area. Specifically, it assessed land allocation processes, identified the changing nature of land use, distribution, condition, and finally explained factors influencing land use changes.

The study has shown that pastoralists' arrival in the study area involved cheating as some were not registered and others registered less numbers of livestock than the amounts they actually owned, which resulted in villages ending up without having proper records of the number of people and livestock received. These were all alleged and reported during focus group discussions and interviews. Respondents said that those pastoralists who were welcomed in the area used to cheat, especially on the actual number of livestock they possessed. There were no proper recording systems during the registration, but even village leaders were blamed to have been involved in cheating. It was further reported that other pastoralists came in without registration as they came under the umbrella of the few registered colleagues.

The study findings showed that the majority (84.5%) of the respondents acknowledged the existence of land use changes in the study area. This indicates that the coming of pastoralists has led to changes in land use. This is in the form of expansion of newly existing land uses or introduction of new land use activities. The evidence provided for the

land use changes include: establishment of new settlement areas, establishment of new farming lands, drying of wetlands, destruction of vegetation cover, burning of forests and soil erosion.

Land uses before the arrival of the pastoralists in many villages were limited. This was due to the nature of the socio-economic activities which were carried out by the local people. The respondents mentioned that at the village level, especially in the surveyed villages, major and dominant land use types were: agriculture which included crop cultivation (both food and cash crops), human settlement, forest land and burial sites. The arrival of pastoralists introduced livestock grazing. This activity was initially carried out by a limited number of local residents before the pastoralists' arrival in the district; however, after pastoralists' arrival, it became among the dominant land uses being ranked the third (24%) after human settlements (27%) and crop production (33%). It was reported that livestock grazing has become a famous land use in the study area, and it has diversified land use types from four main land use types to five. There are expanded grazing land and human settlements, especially into protected land, forest land and farm land which are a result of human and livestock population increase.

Using binary logistic regression, the chapter showed that pastoralists related factors are responsible in influencing land use changes in the study area. The findings showed that the number of livestock had significant influence on land use change at $p \leq 0.01$. This implies that the number of livestock which were received had impact on the land allocation for the grazing activities to take place, and hence there were no possibilities of avoiding conversion of some land into grazing land. The study also shows that the number of years pastoralists had lived in a village had significant influence on land use change at $p \leq 0.05$. This implies that number of years pastoralist stay in an area signifies an increasing number

of needs for the land for various socio-economic activities which may also influence local people's farm lands. Moreover, the local people's involvement in livestock keeping was found to have significant influence on land use changes at $p \leq 0.05$. In the study area there were few local people who were engaged in livestock keeping before the coming of pastoralists. The coming of pastoralists resulted in increasing number of people engaging in livestock keeping (both pastoralists and receiving communities), hence leading to increasing need for land for that purpose. Finally, the number of economic activities and local people's involvement in livestock keeping had positive coefficients with (β values) of 0.133 and 0.004 respectively, implying that any increase in magnitude of these variables would result in higher possibilities of land use changes.

The responses demonstrated that land conditions (physical appearance of settlement lands, wetlands, grasslands, forest lands and agricultural lands) had changed as compared to the period before the arrival of pastoralists. The findings demonstrated that settlement land had expanded as reported by the majority (57%) of respondents. The increasing number of pastoralists in the area was reported to be one of the factors for those changes. They influenced establishment of new settlements in places which were previously not in use and which were not allocated for newcomers.

Many of the respondents (41%) indicated that agricultural lands were extended and invaded for settlement and livestock grazing (32.5%). One of the influencing factors for the changes is the increasing number of livestock in the area. Moreover, it was reported that agro-pastoralists have influenced extension of cultivated lands as they increase establishment of new farms in areas formerly not used for crop farming. Many (49%) of the respondents declared that the wetlands had also been invaded and were getting reduced in quality (42.5%). The influencing factors include: number of livestock and the increasing

number of pastoralists and agro-pastoralists; these have increased demand for water for various uses and adversely affected water quality in the grazing areas. Furthermore, a greater proportion (52.5%) of the respondents testified that the grasslands had declined in size. Moreover, the findings showed that 49.5% of the respondents reported that the forest lands were invaded while 40.5% contended that the forest lands were degraded. The influencing factors include: increasing number of livestock and presence of pastoralists which have led to the establishments of new settlement, new agricultural lands, livestock grazing areas and increased forest fires when fire is used to clear vegetation for crop farming and regeneration of new pastures.

The study concludes that indeed the coming of pastoralists and agro-pastoralists in the study area has caused land use changes as they have caused both human and livestock population to increase hence more demand for land for various uses. The study further concludes that the arrival of pastoralists went along with violation of legal procedures deliberately. This is an alert for the authorities as for any activity which is illegal there are possibilities to result in adverse effects as they get implemented. The continuing migration of pastoralists into the district leads to land use and land features changes with some adverse effects. The changes have branded the areas with vegetation clearance, widespread of forest fires, and destruction of water sources. Land uses have changed compared to the time before the arrival of pastoralists. In the past, land uses were dominated by, but not limited to, agriculture and human settlements. After the pastoralists' arrival, land uses are dominated by agriculture, human settlement and livestock keeping.

6.1.2 In-migrant pastoralists effects on socio-economic activities

Prior to the arrival of the pastoralists in the study area, the residents were involved in various income generating activities. The vast majority (84%) were engaged in crop

production while (8%) were engaged in fishing and coconut vending, and 5% were self-employed in various occupations like in vehicle driving, masonry and tailoring, and very few (3%) were engaged in livestock keeping. Food crops were produced for home consumption, and the surplus was sold; cash crops included coconuts and cashewnuts. Thus, until the advent of pastoralists, few residents were involved in livestock keeping. This implies that, basically, before the interactions with pastoralists, the local people in the study area were limited to such economic activities. It was reported that about seven new economic activities and sources of income had been introduced in the study area. These included food crops production and selling (including sweet potatoes, millet, sorghum and legumes like beans) which are produced for food and commercial purposes. After the arrival of pastoralists, the local people have been able to open retail shops, meat shops (butchers), engage more in charcoal burning and selling, selling cattle and milk (dairy products), and to harvesting and selling timber. It was established that the local people were not used to produce the above mentioned crops, but they started producing them after they were inspired by the pastoralists who introduced these crops in the study area.

This study has indicated that the local people were exposed to new sources of income and were forced to get involved in new economic activities as a strategy for income sources diversification. Two-thirds of the respondents (67%) had experienced and were aware of newly introduced economic activities, while those who did not have knowledge and others who were not sure of the new economic activities constituted 33%. The new activities included retail shop keeping, crop products vending, selling meat in shops (butchery running), livestock keeping, and operating bars (beer retail and whole sale shops). Although others reported that there were no new economic activities diversification after the arrival of the pastoralists, these results imply that there is direct link between pastoralists' arrival and introduction of new economic activities in the study area. Whereas

the local people had no culture of livestock keeping, but they have been influenced to undertake this activity, and they also run meat business and have established brew selling micro-projects. Many (54%) of the respondents admitted that there were households which were engaged in livestock keeping in their villages, and 46% said that they had not witnessed households participating in livestock keeping. The majority of the respondents (90.3%) indicted that many of the households participating in livestock keeping had started doing so after the arrival of pastoralists. The types of livestock owned by the local people included cattle and goats.

Binary logistic regression was applied to assess the effects of factors on the chances that local people would engage in new economic activities. Four factors made a unique statistical significant contribution to the model. These are household head level of education ($p \leq 0.05$), age of the household head ($p \leq 0.01$), religion ($p \leq 0.001$) as well as sex of the household head ($p \leq 0.05$). The results demonstrated that the demographic maturity age (30-39 and 40-49) was the most likely age to respond positively to the new economic activities and easily engage in exercising them. Furthermore, the study showed that the majority of households with members who were Christians only (64.4%) agreed to engage in newly introduced economic activities than those who were Muslims (only 33.5%) and those with both Christians and Muslims members (31.5%). These findings imply that there were variations in undertaking new economic activities basing on religion of the household members whereas the Christians were more likely to take new economic activities and engage in them more positively as compared to Muslims.

Moreover, the findings imply that the level of education one possesses influences the choice of economic activities to involve in; the more one is educated the more one is likely to make choices in diversification of economic activities to engage in. The findings

indicated that, as far as education is concerned, the majority of households whose heads held primary education (seven years of education) (75.3%) reported to have engaged in new economic activities as compared to local people who had other levels of education in the study area. It was also indicated that for the household members or any member in a community to be influenced to engage in new economic activities, sex of the household head also played a role. The study further showed that there were cultural interactions since the arrival of the pastoralists, particularly with respect to intermarriages, change in dietary habits, religion (increased Christian believers), traditional norms and beliefs, cultural interactions (dowry price payments and the use of traditional forms in diseases treatment and healing). Intermarriages are reported to be one side that only resident women were married to pastoralists either permanently or as concubines (not accepted by parents).

The chapter concludes that the coming of the pastoralists to the study areas has brought significant socio-economic changes among local people like change of sources of income and socio-economic activities. The study has shown that indeed the pastoralists' arrival in the study area had significant effects to the socio-economic activities and sources of income of the local people in the study area. This has been shown through the evidence that more people from local communities are now engaging in livestock keeping which was traditionally practised by few of them. In this case the study findings have shown that pastoralists have influenced the local people to undertake livestock keeping, and they have also introduced some other economic activities and they have influenced the local people to establish some other new economic activities in their area as the response to the growing population daily needs. There are elements of cultural and social interactions between the locals and the pastoralists. These interactions happen in the forms of

intermarriages, dietary habit changes, and exchange of worshiping and traditional norms and values.

6.1.3 Land use conflicts escalation as an aftermath of pastoralists' in-migration

Land use conflicts escalation as a consequence of the arrival of in-migrant pastoralists is discussed in chapter four to address the third objective. The chapter was responding to the land use social effects of pastoralists' in-migration in Rufiji District, and the main concern was to examine the land use conflict escalation. The chapter describes issues of conflicts over land between various actors. Specifically, it analysed the land use conflict actors and described existence of conflicts before and after the arrival of pastoralists, causes of those conflicts, conflict management and stakeholders involved in the management process.

Pastoralists were not settling in the allocated areas because the government had not provided them with important infrastructures such as cattle dips (locally termed as "*malambo*"). As a result, they moved to farm lands searching for water for their livestock. This resulted in occurrence of conflicts between the local people and pastoralists. This implies that the local communities and pastoralists were not living in peace. The study established that sometimes conflicts between the locals and the pastoralists arose when there were no agreements regarding compensation for loss caused by cattle devastation of farms. Sometimes pastoralists refused to pay for the loss, hence leading to misunderstandings between the two parties.

The existence of conflicts between village leaders and pastoralists which occur when some pastoralists do not abide by laws and by-laws especially when they are accused of and obliged to pay compensation for the destroyed crops, either in cash or in kind. They feel that they are oppressed and neglected. As such, pastoralists do not trust village authorities;

hence this leads to conflicts between them. The other conflicting parties are village authority and villagers. The cause is the village leaders who are accused of being bribed when it comes to solving emerging allegations that pastoralists have destroyed local people's farms and their crops. Bribe forces leaders to be biased in favour of pastoralists when deciding on allegations brought before them. Yet, some land use conflicts occur among villagers (intra-village conflicts) and between villages (inter-village conflicts). These kinds of conflicts have existed even before the arrival of pastoralists. Another kind of conflict is intra-sector involving pastoralists and agro-pastoralists. This conflict is caused by pastoralists feeding their livestock on the farms belonging to agro-pastoralists.

The study has revealed various techniques to reduce occurrence of conflicts in the study area. All the respondents acknowledged the techniques mentioned, which implies that the techniques are recognized by both community members and pastoralists. The famous and most applicable techniqueis frequent meetings with pastoralists' leaders who also include village leaders and the conflicting parties who also attend the meetings. Others include application of by-laws, evaluation of loss, reporting to the police and cases being opened at the primary courts, conflict mediation between conflicting actors, involvement of pastoralists and village elders in conflict resolution and evacuating pastoralists out of the village. The use of the police and the primary court were criticized as lacking transparency among stakeholders hence leading to un-ending corruption. The technique of evaluating the loss caused was done in a manner that pastoralists are required to pay for the loss identified.

The section concludes that land use conflicts were common before the arrival of pastoralists. However, there is an increasing number and type of actors involved in the conflicts. Currently, there are still prevailing conflicts caused and steered by the arrival of

pastoralists. The main causes of land use conflicts are: pastoralists' invasion and livestock grazing on crop farms, pastoralists not observing boundaries of the grazing land demarcated for them, village leaders favouring pastoralists in decisions and ignoring natives' rights, government authorities' ignoring village agreements, and pastoralists refusing to pay compensation for the farmers' destroyed crops.

6.1.4 The impact of in-migrant pastoralists on livelihood outcomes of the local people

The study intended to establish a link between pastoralists' arrival and the local peoples' livelihood. Chapter five showed the impacts of in-migrant pastoralists on livelihood outcomes of the local communities. The objective was to analyze the coming of pastoralists in Rufiji District and its impact on the livelihood of the local communities. Specifically, it identified livelihood outcomes among the local people as triggered by the coming of pastoralists. The assumption was that the coming of pastoralists in the area has affected significantly local people's livelihood outcomes either negatively or positively.

The study findings indicated that 69.5% of the respondents reported that there was advent of livelihood outcome effects which were caused by the arrival of pastoralists whereas 30.5% reported that there were no impacts. The effects which were mentioned include: recurrent conflicts, emergence of new businesses, destruction of farmers' farms and crops, cultural interactions and local people's land invasion. Furthermore, 55.4% of the respondents reported that the impacts were positive while 44.6% said that the effects were negative. The most common livelihood outcome reported by the respondents was the recurrent of resource (land use) conflicts (10.8%), followed by introduction of new crops (9.5%) and introduction of new livestock (9.3%) as livelihood outcomes on the other hand. The new livestock included donkeys and bulls for farm tilling and carrying goods. The

lowest noted experienced livelihood outcome was growing social interactions (8.5%). Other livelihood outcomes included: construction of modern houses (iron sheet roofed and cement blocks), establishment of village sustainable land use plans, introduction of new sources of income, population increase, and change in agricultural systems and techniques, increased access to social services and improved food security.

The mean score on the livelihood outcome after the arrival of pastoralists among the local people was 6.2, which were at the high level as the moderate mean score was 6.0. The findings furthermore showed that 49.5% of the respondents had high level of outcomes; 28.5% had moderate outcomes and 22% were found to have a low livelihood outcome level as a result of the influence of pastoralists in the study area. These findings were confirmed by 55.4% of the respondents who stated that the coming of pastoralists had resulted in positive impacts on the livelihood outcomes of the local communities in the area.

To determine the impact of pastoralists on the local people's livelihood outcome attainments at household and community levels, a multiple regression model was applied whereby β-coefficients were computed to obtain the directions and significance of the predictors. The results showed that number of newly introduced economic activities had a positive β coefficient (0.737) at $p \leq 0.05$; the presence of investors was found to have a positive β coefficient (0.879) and a significant influence on livelihood outcomes at $p \leq 0.05$. The results further indicated that the new agricultural systems and techniques had significant impacts with a positive β coefficient (1.859) at $p \leq 0.001$, and change in land use had a significant negative β coefficient (-1.448) at $p \leq 0.05$ in influencing the local people's livelihood outcome attainments.

It is concluded that indeed the livelihoods in the study area have been affected by arrival of the pastoralists, and the effects are both positive (advantageous) and negative (disadvantageous). The knowledge generated from this study provides insights that can be used during formulation of appropriate interventions to improve the livelihoods of the local people in the study area and other areas in the country (Tanzania) with similar conditions. It is also concluded that, apart from the challenges caused by pastoralists, there are potential opportunities that may arise from interactions between pastoralists and crop farming communities.

6.2 Recommendations

6.2.1 Influence of in-migrant pastoralists on land use change

The study calls upon the responsible authorities from village to the district levels to take proper measures to make sure those unethical procedures (behaviours) are avoided so as to avoid harm to the communities. This will enhance transparency and trust among village leaders and village members. Furthermore, the study calls upon community-based land use planning whereby all villages are involved in the planning including pastoralists and agro-pastoralists.

Secondly, policy makers need to create an enabling institutional environment at state and local government levels that is sensitive to the specific needs and constraints of pastoralists and also provide them with space and authority for decision making. Development planners should have a clear understanding of the national policy context, of supportive and unsupportive policies, and of the general attitude of government towards pastoralism. A special focus on pastoralist-related issues and constraints is also required in the Five Year Development Plans (FYDPs).

The study recommends that there is a need for the pastoralists recounting so that the district can recognize their actual population number. Not only the human populations recounting should be done, but also the same should be done to the herds of cattle owned. This will enable the government at the district and village levels to have reliable land use and development planning at both levels.

There is a need to address the fundamentally important question of land rights, ensuring that pastoral development is built upon greater security of access to and use of natural resources. Development must address more and has to take into consideration the bundle of rights that pastoralists are denied, if significant steps are to be made in sustainable development of pastoralism.

Appropriate land use plans should be developed to ensure that land uses are properly established. The central government should not only allocate enough budgets to make sure that this activity is fulfilled but also should act and provide support to the development agencies and NGOs as well as with other development partners. This should involve identification of grazing areas and making sure that all necessary and required services such as cattle drinking sources of water are found around.

Finally, there should be emphasis on interventions for increased formal and informal land conservation activities within the study area which involve all the groups (local people and the in-migrant pastoralists) which may mitigate or even prevent land use change effects on the ecology of the area in the future. This means that land use management should rely on associating traditional and establishing communal managed areas within the district.

6.2.2 Effects of pastoralists' in-migration to the socio-economic activities of the local people

Basing on the nature of pastoralists, particularly mobility life style which is attributed to various reasons, the study calls upon policy response in several areas where similar problems related to pastoralism occur, settlement policies and all cross cutting sector policies. There is a need for policies and programme interventions through establishment of good relationships between the local people and in-migrating pastoralists.

There is a need for promoting investments and policies that support pastoralism. The study also argues for investing in basic services like education, infrastructure, and marketing. These are appropriate ways to guarantee sustainable development and poverty reduction in the long term. Basic services include markets, and the use of markets is greatly needed to be improved.

It is recommended that pastoral policy should include and identify the issues concerning mobility of livestock keepers and their related socio-economic effects to the destination areas. This should ensure that receiving communities must be aware of the economic advantages of receiving pastoralists and cooperate with them in trying to reduce the associated disadvantages in the areas.

6.2.3 Land use conflicts escalation as an aftermath of pastoralists in-migration

It is recommended that the relevant and responsible authorities should make sure that the existing land use conflicts are settled by establishing appropriate policies and resolution techniques. This can be done by ensuring the involvement of all land use stakeholders. It is also recommended that decision makers should incorporate a diversity of actors' interests to handle conflicts and thus to improve land-use planning and management decisions.

The study calls upon the villagers' consultation in various decisions made over their land. This will enable the reduction of frequent eruption of land use disputes in the study area and in some other areas in Tanzania which are experiencing the same situation. Policy formulation programmes for example, should be restructured and done from the grassroots level and involving effectively all the stakeholders and beneficiaries like crop producers (farmers), the pastoralists and agro-pastoralists.

The study calls upon all land users (beneficiaries) like pastoralists, agro-pastoralists, crop producers (farmers) and other investors in the study area to have respects to each other. This calls for all of them to respect the value of one another, not only that but also the government (village and district levels) treat all the stakeholders equally especially on making decisions related to land uses.

The study recommends the need to the provision of education to all citizens, especially on land laws and by-laws available in Tanzania and in the study area. This can be done by all stakeholders including the government itself, Community Based Organisation (CBOs), Non-Governmental Organisation (NGOs) as well as through established Civil Society Organisations (CSOs). This should go together with efforts to strengthen the land disputes settlement organs especially those from the village level to the district level.

The responsible authorities should make sure that pastoralists are provided with necessary infrastructure and their needs so as to reduce unnecessary movements which make them to invade prohibited areas which result into conflicts among the people. Furthermore, the study recommends that the arrival of pastoralists should not be taken to be destructive, but there should be efforts to derive constructive aspects to the receiving communities. Leaders should observe and respect village agreements, regulations and procedures of

village land allocations as stipulated in the Village Land Act 1999. Finally, there is a need to invest in local governance, for linking customary and statutory institutions, and for building local government capacity to govern more effectively in partnership with pastoralist communities.

6.2.4 Impact of in-migrant pastoralists on livelihood outcomes of the local people

It is recommended that there is a need for relevant stakeholders such as government agencies and non-governmental organizations at different decision making and operational levels to strengthen the positive identified livelihood effects caused by pastoralists, while those that have negative effects should be taken as challenges for improvement, especially in terms of making the best use of socio-economic opportunities that have emerged after the arrival of pastoralists. These may include encouraging the local people to engage in mechanized agriculture as well as livestock keeping in a much environmental friendly and livelihood improving way.

It is also recommended that there is a need for an inter-sectoral approach in dealing with challenges facing the migrant pastoralists and the local people in the destination areas whereas all stakeholders should be included in the management and control of the pastoralists' migration as well as establishing properly planned receiving mechanisms in the destination area.

6.3 Contribution of the Research and Policy Implications

Three theories as developed by different scholars who have described issues concerning migration and social interaction were applied to this study. These are: Malthus' Population Theory (1798), Social conflict model and the Migration Ideology by Esther Boserup (1965).

The Malthus' Population Theory (1798) explains issues on population increase in a given area. The theory considers both migration and population increase consequences, and migration is regarded as one of the factors for population increase. The theory postulates the dangers population growth exerts over the resources. This study determined the consequences of pastoralists' migration on land use of the destination areas. The findings from this study have supported Malthus by showing that indeed the coming of pastoralists in the area has led to the increased pressure over the land resources. It showed that the majority (84.4%) of the respondents acknowledged the existence of land use changes. The evidence which proves the existence of land use change includes: establishment of new settlement areas, establishment of new farming lands, drying of the wetlands, destruction of vegetation cover, burning of forests and soil erosion.

Social theorists in the nineteenth century and in the early twentieth century were concerned with conflict in society. Conflict theorists did not believe that societies smoothly evolved to higher levels. Instead, they believed that conflicting groups struggle to ensure progress (Coser, 1957). Conflict theorists assert that conflict is a necessary condition for change. It must be the cause of change. Thus, conflict is associated with all types of social change in some way or another. The study was based on three Social conflicts model ideas by Dahrendorf (1959), Simmel (1969) and Aubert (1963). According to Dahrendorf (1959), conflicts are a struggle between social groups and also are results of clash of group interests. On the side of Simmel (1969), conflict is merely an intense form of social interactions and is a normal part of the social order. On the other hand, Aubert (1963) classified the types of interpersonal conflict that arise in dyadic relationship between two individual groups, the sources of these conflicts and the ways of resolving these conflicts. The findings of the study imply that the theories and ideas on conflicts were lacking issues concerning the people's migration aspect that have also impacts on

accelerating social conflicts among societies as far as scarce resources (land) are concerned. Findings have also shown the existence of various actors (classified) in social conflicts with different interests of their existence which were also lacking in the theory. Finally, the findings have come up with social conflicts mediation techniques as described by Dahrendorf (1959), Simmel (1969) and Aubert (1963).

Boserup (1965) treats migration to be one of the determinants of population growth of any society. Boserup argues that intensification is an induced response to population growth. The central thesis of the theory is an argument that *intensification is an induced response to population growth which is either occurring naturally or through migration processes.* The study showed that the in-migrants cannot only bring about innovations in the destination areas as suggested by Boserup, but also they can bring changes to people's livelihoods. As far as this study is concerned, the impacts are both negative and positive. The findings also showed that population growth in a certain area cannot only influence innovation as revealed by Boserup, but also it may lead to conflicts over existing resources in the area as a result of increased resource use demand.

Pastoralists are characterised by migratory life styles as determined by the availability of green pasture and favourable weather conditions for their livestock. As a result of this shifting among the pastoralists' societies, various changes may occur among the migrants and also the in-migrants may influence changes among the receiving communities in the destination areas being a result of social interactions. In the recent years, there has been in-migration of pastoralists in Rufiji district with their large number of cattle from other places in search for pastures and water. In 2006 the coming in of pastoralists in Rufiji District was fuelled by the government's decision to evict pastoralists who resided in Usangu-Ihefu wetlands.

However, limited studies have focused on socio-economic issues related to pastoralists' migration, and there is little empirical evidence on the pastoralists' in-migration in relation to land use and socio-economic effects among the local people in Rufiji District. This study focused on the land use and socio-economic implications of the in-migrant pastoralists in Rufiji District for the purpose of contributing to this knowledge gap. This is due to the fact that the in-migrating pastoralists into the area are certainly imposing some repercussions and influences on land uses and socio-economic issues in their areas of destination. The findings from this study (summarized in chapter 6) contribute new knowledge on pastoralists' migration and their related land use and socio-economic impacts to the destination areas. The information is important to different stakeholders including development partners, policy makers, environmental/land activists and academicians, for decision making and planning purposes on issues related to pastoralists' migration, land use planning and peoples' livelihood.

6.4 Suggested Areas for Further Research

There is no doubt that pastoralists' migration leads to land use change and also influences livelihoods of the local communities in the destination areas. Pastoralism is among the production systems in Tanzania which provides for natural capital, source of financial capital and social capital. Pastoralists' in-migration challenges in Tanzania are experienced by different regions which receive and host them either voluntarily or involuntarily. This study was confined to Rufiji District being one of the pastoralists' destinations in the country, and did not cover other destinations which have been experiencing pastoralists' in-migration. Because of financial and time constraints, the study was limited to Rufiji District. Therefore, a similar study is important to be carried out in other areas which experience similar situations within Tanzania and in other countries. Linking land use change effects to the livelihoods and livelihood outcomes of

the local people was initially one of the intentions of this study; however it was not completed. It is suggested that further study to be carried out in this area.

APPENDICES

Appendix 1: Research Questionnaire

Questionnaire No._____ out of ____

Sokoine University of Agriculture

Section A: Introduction

My name is___. I work for___ we are conducting a survey in Rufiji District to learn about the **Land Use and Socio-Economic Implications of Pastoralists In-migration in Rufiji District Tanzania.** You have been chosen by chance to participate in the study. I want to assure you that all of your answers will be kept strictly confidential. I will not keep a record of your name or address if you do not want to. You have the right to stop the interview at any time or to skip any questions that you don't want to answer. There are no rights or wrong answers. Your participation is voluntary, but your experience could be very helpful to other communities in Tanzania and to our study.

Section B: Ethical Issues

Ethical question	**Yes**	**No**
1. Do you have a question		
2. Do you agree to be interviewed		
3. Is it good to start our conversation now		
4. Is it good to talk in private		
5. Is this a good place to hold interview		
6. If the answer in 5 above is 'No' do you have a good place you would like to go		

Section C: Verification - Only for the Researcher, Peer reviewer and Interviewer

Name of Interviewer			
Date of Interview	Year	Month	Day
Name of the peer reviewer			

Section D: Socio-demographic and geographic information

1. Region of the household members (Tick where applicable)

Religion of affiliation	**Response (Tick)**
Christians only	
Muslims only	
Christians and Muslims	

2. District:_____

3. Ward: _____

4. Village:_____

5. Name of the head of the household:_____

6. Sex of the head of the household: 1. Male (_____) 2. Female (_____)

7. Age of the head of the household: _____years

8. Education of the HH: **(Circle the correct answer)**
   1. Primary education (7 years) 2. Secondary education (11 years)
   3. Madrassa (1 year) 4. Other (specify)_____

9. Name of the respondent (If not the H/H):_____
10. Sex of the respondent (If not the H/H):_____

11. Age of the respondent (If not the H/H):_____years

12. Marital status of the respondent (If not the H/H): 1. Married (_____) 2. Single (_____)

13. What is your level of education? (If not the H/H): **(Circle the correct answer)**
    1. Primary education (7 years) 2. Secondary education (11 years)
    3. Madrassa (1 year) 4. Other (specify)_____

14. Main occupation of the Household Head **(circle the correct answer)**
    1. On-farm employment 2. Off-farm employment

15. How long have you been in the area (Should be more than fifteen years):____years

16. As a **Migrant** or an **Original** settler of the village:_____

Section E: The Land use changes of Pastoralists in-migration

1. What size of land does your household possess currently? _____

2. Is there any piece of household land which has been invaded by pastoralists?
   1. Yes (_) 2. No (__)

3. What was the use of your invaded land? Mention:
   i. _____ ii. _____ iii. _____

4. What are the current uses of the household land after the invasion?
   i. _____ ii. _____ iii. _____

5. How have you been affected by the invasion of your land? Explain: _____

6. What were the main land uses before the arrivals of the pastoralists in the village?
   i._____ ii._____

7. What was the dominant land use among the above mentioned land uses before the arrival of pastoralists in the area? Mention: _____

8. Are there any newly introduced land uses after the arrivals of the pastoralists in the area?
   1. Yes (_____) 2. No (_____)

9. If the answer in 8 above is **YES**. Mention the land uses:
   i. _____ ii._____

10. What is the dominant land use among the above mentioned land uses after the arrival of pastoralists?
    Mention: i. _____ ii. _____

11. How many plots of land do your household possess currently? _____

12. If in 11 above there are more than one plots of land, are they located within the **same village** or in a **neighbouring village**? _____

13. How did you acquire that piece of land? **(Circle the correct answer)**
    1. Inherited 2. Purchased 3. Allocated by village government 4. Borrowed 5. Rent

14. What total size of the plots of land does your household possesses? _____
15. What use do you put into the land plots you posses? Mention: i. _____ ii. _____
16. Generally do you experience land use changes in a village? 1. Yes (_____) 2. No (____)

17. Have you attempted to change land uses over the plots of land you posses over the past years since the arrival of pastoralists? 1. Yes (_____) 2. No (_____)

18. Give reasons for the land use changes by filling the following table:

Sn.	Previous land use	Changed use to:	Reasons for land use changes
1			
2			

19. Since when did the village started experiencing the coming of pastoralists?
Mention the year first arrived: _____

20. Is there any land demarcated as land for pastoralist activities only in the village?
1. Yes (_____) 2. No (_____)

21. If YES in 15 above, is the demarcated grazing land enough for grazing? _____

22. Give reasons for your answer in no. 14 above: i. _____ ii._____

23. Situation of population size in a village: (Tick what is appropriate)
1. No changes (____) 2. Decreasing (_____) 3. Increasing (____)

24. Is the situation associated with the arrival of pastoralists? 1. Yes (___) 2. No (___)

25. If YES give reasons: i._____ ii._____

26. What is the quality of the land after the pastoralists' arrival? (Tick the right response)
i. Good quality (_____) ii. Worse quality (_____) iii. Better quality (_____)
iv. Best quality (_____) v. Moderate quality (_____)

27. Give reason(s) for your answer(s) in (26) i. _____ ii. _____

28. Have you ever experienced land use changes in the village? Yes (____) 2. No (____)

29. If the answer is YES in 28: Can the following be considered as causes of land use change in the village? **(Tick what is applicable)**

Sn.	Causes	Yes	No
1	Population pressure/increase		
2	Expansion of agriculture activities		
3	Expansion of forestry activities (timber, fire wood and charcoal burning)		
4	Livestock keeping		
5	New economic activities		
6	Number of livestock keepers		
7	Natives involvement in livestock keeping		
8	Number of year pastoralists in a village		
9	Land use redistribution		
10.	Expansion of settlement land		

30. Explain how each factor above has contributed to the land use changes: _____

31. What is the condition of the following land uses in the area? (Tick what you think is right)

	Perceptions on land use conditions			
Land use type	Expanded	Decreased	Unchanged	Invaded
Settlement land				
Agricultural land				
Wetland				
Grassland				
Forest land				

Section F: Socio-economic effects of pastoralists in-migration among the local people

1. What are the household income sources over the past five years?
   i. _____ ii. _____

2. Have these sources kept on changing over the years? Yes (_____) 2. No (_____)

3. If the answer in 2 above is YES give reasons: i. _____ ii. _____

4. How many household members does your house contain? _____

5. Main Economic activities of every member in the household. Fill the following table:

Sn.	Household members	Economic activity
1	Household head	
2	Member no. 2	
3	Member no. 3	
4	Member no. 4	
5	Member no. 5	
6	Member no. 6	
7	Member no. 7	

6. Are there any economic activities which have been changed/ newly introduced due to the arrival of pastoralists? 1. Yes (____) 2. No (_____)

7. If the answer is YES in 6 above fill the following table

Sn.	Economic activity before	Economic activity changed to	Newly introduced economic activities
1			
2			

8. Does the household participate in livestock keeping? 1. Yes (_____) 2. No (_____)

9. When did it start? 1. Before the arrival of pastoralists (____) 2. After the arrival (____)

10. What type and number of livestock kept in the household? Fill the following table:

Sn.	Type of livestock kept	Size/number of livestock kept

11. Is the number **increasing** or **decreasing**? _____

12. If the number of livestock is increasing is there any influence from the arrivals of pastoralists?
    1. Yes (_____) 2. No (_____)

13. Explain **HOW** and **WHY** is the number increasing or decreasing_____

14. What can you explain about the arrival of pastoralists in the area?
    Explain: _____

15. What was the average number of livestock possessed by the arrived pastoralists? (Number possessed by each of the pastoralist arrived in a village: _____

16. What challenges have you experienced during and after the arrival of pastoralists in the area?
    i. _____ ii. _____

17. What are your suggestions on pastoralists' resettlement mechanisms?
    i. _____ ii. _____

18. Apart from animal keeping, what are the other socio-economic activities done by pastoralists? Mention: i. _____ ii. _____

19. Among the activities (18) which one have been introduced after pastoralists arrival? Mention:
i. _____ ii. _____

20. Which of them require land acquisition?

Sn.	New Socio-economic activity	Does it require land acquisition? 1. YES___ 2. NO___
1		
2		

21. In agriculture, are there any newly introduced agriculture systems/activities?
1. Yes (__) 2. No (__)

22. If the answer is YES in 21 above, mention them?
i. _____ ii. _____ iii. _____

23. In agriculture, are there any newly introduced crops? Yes (__) 2. No (____)

24. If the answer is YES in 23 above mention them? i. _____ ii. _____

25. How useful/important are they? Fill in the following table

New Agriculture system/activity		New Crops
Usefulness	i. _____ ii. _____	i. _____ ii. _____

Section G: Effects of land use changes and land use conflicts escalation of the pastoral in-migration

1. What is the current land situation/condition in the area? Explain: _____
2. How was the land in the village distributed according to its uses before the arrival of pastoralists? Mention the various uses attached: i. _____ ii. _____
3. How is the current land in the village distributed according to its uses? Mention the various uses attached: i._____ ii. _____
4. How is the current household land distributed according to its uses? Mention the various uses attached:
i. _____ ii. _____ iii. _____
5. What are the land management systems in the village? Fill in the following table:

Sn.	Traditional land management system	Newly introduced/adopted land management systems (after the arrival of pastoralists)	Are the traditional systems still working? 1. Yes 2. No
1			
2			

6. How effective are the traditional land management systems? Explain: _____
7. How effective are the newly introduced land management systems? Explain: _____
8. Were there land use conflicts before the arrival of pastoralists? 1. Yes (__) 2. No (___)
9. If YES Explain how land use conflicts:_____
10. Mention the parties involved in land use conflicts before the pastoralists arrival: _____

11. Are there still land use conflicts currently existing in the area? 1. Yes (___) 2. No (___)
Explain how: _____

12. Mention the parties involved in land use conflicts after the arrival of pastoralists: _____

13. Explain/Mention the tactics used to reduce land use conflicts in the village:
i. _____ ii. _____ iii. _____

14. Mention the stakeholders involved in land use conflicts resolving:
i. _____ ii. _____ iii. _____

15. What role is played by every stakeholder mentioned in 14 above?

Stakeholder	Playing role

Section H: Effect of socio-economic dynamics of pastoral immigration

1. Do you appreciate the arrival of pastoralists in your village/area? 1. Yes (____) 2. No (____)

2. Are there any economic changes you have made after the arrival of pastoralists in your village?
1. Yes (_____) 2. No (____)

3. If the answer in 2 above is YES. Mention the changes you have experienced:
i. _____ ii. _____ iii. _____

4. Have the pastoralists invaded your land since their arrival? 1. Yes (____) 2. No (_____)

5. If YES state HOW: _____

6. What effects did you experience after the invasion of your land? **Explain:** _____

7. What types of food crops are produced in your household?
Mention by filling the following table and also show the origin of the crop mentioned:

Sn.	Types of food crops produced in a household	Origin of the crop produced (X)	
		Traditionally produced	Introduced by pastoralists
1			
2			

8. What types of cash crops are produced in your household?
Mention by filling in the following table and also show the origin of the crop mentioned:

Sn.	Types of cash crops produced in a household		Origin of the crop produced (X)	
			Traditionally produced	Introduced by pastoralists
1				
2				

9. Mention which of the mentioned crops have been introduced by pastoralists:
i. _____ ii. _____ iii. _____

10. Does your household have enough land for food production? 1. Yes (___) 2. No (____)

11. If NO, has it been caused by pastoralists invasion into the land? 1. Yes (___) 2. No (___)

12. If YES in 11 above Explain how: _____

13. What is the situation of food production after the arrival of pastoralist in your area/village? _____

14. Is the household food secured? 1. Yes (____) 2. No (_____)

15. If the answer in 14 above is NO explain WHY: _____

16. If the answer in 15 above is YES justify by filling in the following table:

Sn.	Food Security Pillars	Situation in a Household (Tick in one box for each)		
		Good	Better	Best
1	Food availability			
2	Food accessibility			
3	Food utilization			
4	Food consumption			

17. What component in among the food security pillars which have been **affected** by the arrival of pastoralists and land invasion in your household? (TICK One of the components)

Sn.	Food security pillars and component		Tick	Comment HOW
1	**Food availability**			
	Components	Food production		
		Food shocks		
		Animal invasion		
2	**Food accessibility**			
	Components	Household income		
		Food price		
		Market supply		
3	**Food utilization**			
	Components	Dietary intake		
		Health status		
		Quality of care		
4	**Food consumption**			
	Components	Norms		
		Food diversity		

17. Are there any diet changes since the arrival of pastoralists in your household? 1. Yes (_) 2. No (_)

19. If the answer in 18 is YES Explain HOW: _____

20. What are the existing social relations/interactions between in-migrant pastoralists and host cultivators? (Tick which it applies) and state its land use impact

Sn.	Social relations	Response (Tick)	Effects on land use
1.	Intermarriages		
2.	Worship		
3.	Traditional beliefs		
4.	Traditional Customs		

21. What are the economic opportunities which have been brought by the arrived pastoralists in your village? Mention and show how they have effects on people's life in your village:

Sn.	Opportunities	Life impacts in a village
1		
2		

22. Do you experience new economic activities introduced by pastoralists? 1. Yes (___) 2. No (__)

23. If YES how many new economic activities have been introduced since pastoralists arrival:__

24. What are Socio-economic activities carried by in-migrant pastoralists apart from animal keeping in the village? Mention: i. _____ ii._____ iii._____

25. Have they acquired extra land to undertake those activities? 1. Yes (____) 2. No (____)

26. If the answer is YES in 25 above, have they affected your agricultural production processes and systems?
1. Yes (___) 2. No (___)

27. Qualify your answer in 25 above by explaining HOW and WHY:

_____

28. Have the pastoralists arrival led to the establishment of new sources of income?
1. Yes (_____) 2. No (____).

29. If the answer in 28 is YES, mention the established sources of income and state their usefulness in your life. Fill in the following table:

Sn.	New sources of income	Usefulness
1		
2		

30. How many market centres did you have before the coming of the pastoralists?_____

31. How many market centres do you have after the arrival of the pastoralists?_____

32. Mention villages where they are allocated:
i. _____ ii. _____

Section I: Linking pastoralists arrival and livelihood effects

1. Apart from depending your living from the land what else do you depend for a living?
Mention: i. _____ ii. _____ iii. _____

2. Do you experience any challenges on the livelihoods after the arrival of pastoralists in the village?
1. Yes (___) 2. No (___)
3. Are the challenges negative or positive? _____

4. Mention the livelihood challenges:
i. _____ ii. _____ iii. _____

5. Do you associate these challenges with the presence of pastoralists? 1. Yes (___) 2. No (___)
6. After the arrival of pastoralists and their invasion to the village land are there any changes you have experienced on people's sources of living? Mention:
i. _____ii. _____iii._____

7. Do you experience the presence of investors as attracted by the presence of pastoralists in your village?
1. Yes (___) 2. No (___)

8. Have they acquired land for investments? 1. Yes (__) No (___)

9. If the answer in 8 above is YES explain how they acquired the land. (Tick) where it applies:
1. Illegal invasion (__) 2. Bought from the villagers (__)
3 Distributed by the village authority (___) 4. Distributed by the district authority (___)

10. Mention the investors and explain the use of the invested land by filling the following:

Sn.	Land investors	Use of the invested land
1		
2		

11. Explain how have you been affected by these investors: _____

12. Have you experienced a situation whereby your livelihoods have been impacted by the presence of pastoralists? 1. Yes (___) 2. No (___)

13. Are the impacts to the livelihood in what position? **(Tick the appropriate one)**
    1. Negative (__) 2. Positive (____)

14. Mention the mostly experienced livelihood impacts:
    i. _____ ii. _____ iii. _____

15. Do you practice new agricultural systems and techniques as introduced by the pastoralists?
    1. Yes (___) 2. No (____)

16. Mention the newly experience agricultural practices: i. _____ ii. _____

17. What is the average number of pastoralists did your village receive? _____

18. Is the number **increasing** of still **the same**? _____

19. What is the average number of livestock possessed by one pastoralist (Cattle, Goats and Donkeys)?_____

20. Do you have new market centres established in the area? 1. Yes (___) 2. No. (___)

21. If YES how many are they? _____

22. Mention where they are allocated (villages): i. _____ ii. _____

23. Mention how have the following livelihood components have been affected

Sn.	Livelihood component	Mention the effects
1.	Livelihood strategies	
2.	Livelihood assets	
3.	Livelihood outcomes	

24. Do you consider the following as experienced livelihood outcomes resulted from the pastoralists' arrival? **Tick.**

Sn.	Livelihood variable impact	Response	Tick
1	Engagement in livestock keeping increased	1. Yes	
		0. No	
2	Improved crop production techniques	1. Yes	
		0. No	
3	Introduction of new trading activities	1. Yes	
		0. No	
4	Increase of unskilled labour opportunities	1. Yes	
		0. No	
5	Improved and increased cash and food crops yields	1. Yes	
		0. No	
6	Change on land uses	1. Yes	
		0. No	
7	Water sources invasion	1. Yes	
		0. No	
8	Increased market facilities and services	1. Yes	
		0. No	
9	Constructed modern buildings (houses)	1. Yes	
		0. No	
10	Corruption among leaders	1. Yes	
		0. No	
11	Resource use conflicts	1. Yes	
		0. No	
12	Introduction of new crops	1. Yes	

		0. No	
13	Introduction of new livestock	1. Yes	
		0. No	
14	Improved food security	1. Yes	
		0. No	
15	Change of agricultural systems	1. Yes	
		0. No	
16	Preparation of sustainable land use plans	1. Yes	
		0. No	
17	Improved and increased sources of income	1. Yes	
		0. No	
18	Improved access to social services	1. Yes	
		0. No	
19	Population size change	1. Yes	
		0. No	
20	Growing social interactions	1. Yes	
		0. No	

25. Tick every component that has contributed to affect household livelihood outcomes as resulted from the pastoralists' arrival. Associate the following factors with effects of livelihood attainments?

Sn.	Causes	Yes	No
1	New economic activities		
2	Pastoralists number of years in a village		
3	Number of pastoralists arrived		
4	Presence of investors in a village		
5	New agricultural systems and techniques		
6	Population change (increase)		
7	Land use changes		
8	Livestock auction market availability		

26. Explain how the above factors have impacted your livelihood: _____

Thank you for your cooperation

Appendix 2: Focus Group Discussion Guide (Local People)

1. How is the land use situation currently and before the arrival of the pastoralists?
2. How many years have pastoralists been in a village?
3. Is there any land demarcated as land only for pastoralist activities in the village?
4. Is the demarcated grazing land enough for grazing?
5. Are there any land use changes taking place at the area?
6. How information sharing should be done between in-migrant pastoralists and local people to improve cooperation of the two parties on land uses?
7. Is there observed population pressure on the land?
8. Do the village leaders practice policies and regulations governing land uses?
9. Are there any other land invaders/investors apart from pastoralists in your village?
10. What attitudes do you have on pastoralists' arrival in your village/area?
11. Do you experience land use conflicts currently?
12. How do you resolve the emerging land use conflicts?
13. What advantages do you gain economically and socially from the pastoralists?
14. Are you comfortable with the steps followed in welcoming pastoralists in the area?
15. What are the shocks that your families are facing after the arrival of pastoralists?

Appendix 3: Key informants Interview Guide (District Land Officers)

1. Are there any land use changes taking place at the area?
2. Can you give some highlights on grazing land allocation exercise in the District?
3. Can you give some highlights on grazing land condition in the District?
4. Do in-migrant pastoralists, local people and other stakeholders in the study area have the ability to translate policies and regulations governing land uses?
5. How is the land acquisition taking place among the in-migrant pastoralists?
6. How do in-migrant pastoralists manage various land use risks in the new area?
7. What is the knowledge on emerging issues on land uses among host communities?
8. Which skills and experience do host communities have on emerging issues on land use?
9. What attitudes do host communities have on pastoralists' invasion?
10. Are there any other land invaders apart from pastoralists in your district?
11. What are the experiences of land use conflicts before and after the pastoralists' arrival?

Appendix 4: Key informants Interview Guide (Village leaders and Elders)

1. Are there any land use changes taking place at the area?
2. What were the uses of land before the arrival of pastoralists in the allocated places?
3. What average number of livestock owned by every registered pastoralist?
4. Is the locals and pastoralists participation in leadership, social and economic activities vital for harmonious living (conflict management)?
5. How is the land acquisition taking place among the in-migrants?
6. Which experience do local people have on emerging issues on land use?
7. What attitudes do local people have on pastoralists' invasion?
8. Are there any other land invaders/investors apart from pastoralists in your village?
9. What advantages do you gain economically and socially from the pastoralists?
10. With the situation at hand, how do you cope with the situation?
11. How do you rate the interaction between the locals and in-migrant pastoralists in the area?
12. What beneficial things/situations from pastoralists which you are happy with?
13. On your own opinion, what steps should be taken in hosting in-migrant pastoralists?
14. With the relocation of pastoralists, is there still enough land for agricultural expansion?
15. Generally, what are the shocks brought by in-migrant pastoralists economically, socially, administratively, politically and ecologically in the area?

Appendix 5: The Allocated Villages for In-migrant Pastoralists Settlement and Pastoralism Activities

Sn.	Name of a Village	Status for the study
1	Mtunda A	
2	Mbwara	
3	Mtunda B	
4	Muyuyu	Selected for the study
5	Nyambunda	
6	Utunge	
7	Utete Magharibi	
8	Chumbi A	Selected for the study
9	Chumbi B	
10	Chumbi C	
11	Ngorongo	
12	Nyamwage	Selected for the study
13	Tawi	
14	Mtanzamsoma	
15	Mwaseni	
16	Muhoro	Selected for the study
17	Mloka	
18	Uponda	
19	Nyambiri	
20	Kiwanga	Selected for the study

Source: Pilot Study, June 2013

Appendix 6: Schedule of Activities

FOUR YEARS WORK PLAN		
S/n	**Activity**	**Duration**
1	Registration	September 2012
2	Literature Review	September 2012-September 2015
3	Concept Note Preparation and Presentation	September 2012-November 2012
4	Proposal Writing and Presentation	September 2012-April 2013
5.	Pilot study	September 2012
6	Development of Data Collection Tools	May-June 2013
7	Phase I: Testing of Data Collection Tools	June-July 2013
8	Phase II: Data Collection and Analysis	August-November 2013
9	Report writing and Result Presentation	December 2013-September 2015
10	Submission for Internal and External Examination	October 2015
11	Thesis Correction, Presentation and Submission	January 2016-July 2016

Appendix 7: Interview and FDG Schedule in the Villages

Name of a visited village	**Interview date**	**FGD date**
Nyamwage village	13th January 2014	14th January 2014
Muyuyu village	16th January 2014	18th January 2014
Chumbi A village	20th January 2014	21st January 2014
Kiwanga village	22nd January 2014	23rd January 2014
Muhoro village	25th January 2014	27th January 2014