



**RESPONSES TO ENVIRONMENTAL RANGELAND DEGRADATION IN
LYANTONDE DISTRICT IN UGANDA**

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Dedication

To my late father Mr John Karooma and my beloved mother Mrs Miriam Karooma.

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First and foremost, I wish to express my sincere gratitude to the Almighty God for the wonderful gift of life He has granted me. Had it not been Him, I would not have made it this further. I am forever grateful to Him for being a great father and a friend.

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Acronyms

CBO	Community Based Organization
DVO	District Veterinary Officer
EKC	Environmental Kuznets Curve
FAO	Food Agricultural Organization
IIED	International Institute for Environment and Development
IPCC	Intergovernmental Panel on Climate Change
IRIN	Integrated Regional Information Network
LVEMP	Lake Victoria Environmental Management Program
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
NEMA	National Environmental Management Authority
NGOs	Non Governmental Organizations
NPA	National Planning Authority
OXFAM	Oxford Committee for Famine and Relief.
SLM	Sustainable Land Management
UBOS	Uganda Bureau of Statistics
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
WBG	World Bank Group
WOCAT	World Overview Conservation Approaches and Technologies

Chapter one:

1.0 Introduction

According to the United Nations Environmental Program (2006), 41% of the land area are dry lands that are homes to more than 2 billion people, while 73% of the 3.4 billion hectares of rangelands worldwide are affected by soil degradation (World Overview Conservation Approaches and Technologies 2009). 70% of 880 million rural people living on less than 1 USD per day are at least partially dependent on livestock for their livelihoods (World Bank 2007). Over 200 million pastoral households are supported by extensive pastoralism which covers a quarter of the global land area (Nori et al 2005). In Africa alone, 40% of its land is dedicated to pastoralism (IRIN 2007).

At the national level, rangelands cover an estimated area of 84,000 square kilometres which is approximately 42% of Uganda's land (Kisamba-Mugerwa 2001). Rangelands are important landscapes to a number of people and biodiversity across the world. They are habitats for various animal species, they contain natural resources such as tree species, vegetation, shrubs, gravel, sand and rocks which are basic materials for building. These rangelands have been environmentally degraded hence affecting livelihoods of people using them as livelihood resources.

The research findings indicated that the degradation of these rangelands has had both positive and negative repercussions to them. The quest for attainment of food security by poor communities is leaving little choice to them hence overusing the limited resources available to them. This has imposed constraints on their livelihoods that is sometimes called a “downward spiral” or “vicious circle” hence forcing them to make trade-offs between the achievement of livelihood sustainability and environmental sustainability (<http://www.ifad.org/events/past/hunger/envir.html>), hence further hindering the achievement of sustainable development.

The concept of sustainable development was first introduced by the Brundtland Commission on Environment and Development (1987) and later on the United Nations Conference on Environment and Development (1992) in which the development strategies were to utilize human and natural resources more efficiently to enhance the quality of life for the people without necessarily reducing development and degrading the environment. Sustainable development was defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Though this concept of sustainable development is subject to various interpretations by different scholars. While there are also no universal definitions of livelihoods, sustainable livelihoods and rangeland degradation, Chambers and Conway (1992:5) define a livelihood as one that comprises the capabilities, assets including the material and social resources as well as activities required for a means of earning a living while a sustainable livelihood as one that copes with and recovers from stresses and shocks, maintains and enhances its capabilities and assets without undermining the natural resource base. While,

“Rangeland degradation is an effectively permanent decline in the rate at which land yields livestock products under a given system of management.....This definition excludes reversible vegetation changes even if these lead to temporary declines in the secondary productivity. It includes effectively irreversible changes in both soils and vegetation” (Abel and Blaikie 1989:113).

The Bahima pastoralists of Lyantonde District in Uganda had a traditional lifestyle of carrying out nomadic pastoralism. Much has changed due to land tenure reform systems that date way back to the 1970s. Land tenure reforms is an institutional factor which embeds environmental dimensions that will be analysed. The settlement of pastoralists due to government laws, policies and programs have affected their lifestyle since they were always on the move looking for water and greener pastures for their cattle. To date, the challenges of water scarcity and pasture shortage still exist.

The area of study was Lyantonde District which lies in the Ankole cattle corridor in South-western Uganda. The area experiences severe drought conditions throughout the year. Pasture on which cattle graze dries up hence leaving much of the land bare and failing to yield the necessary vegetation/ pasture on which cattle feed and this affects animal productivity which takes toll on pastoral livelihoods.

Much as some pastoralists have tried to adapt several livelihood strategies, the degree of adaptation varies from individual to individual and from household to household. Some of their adaptation strategies include herd mobility, agricultural intensification/ extensification, diversification among others as will be analysed. Scoones (1998) argues that most rural livelihood strategies heavily rely on natural resources and this was evidenced during the research study. Natural capital is therefore of paramount importance to the pastoralists.

Within the institutional context, Scoones (1998) notes that whether institutions are formal or informal, they are fluid, ambiguous and are subject to different interpretations by various stake holders. Power relations are central during the decision making processes at all levels and there are always underlying rules and norms. Some local adaptation strategies of the Bahima pastoralists require institutional arrangements as will be analysed.

In order to understand environmental rangeland degradation, I used the sustainable livelihoods framework both as theoretical and analytical framework to answer my research questions. The framework embedded the institutional, social, political, economic and ecological dimensions that I could not ignore exploring. The study investigated how the Bahima pastoralists, local and central governments have responded to environmental rangeland degradation in Lyantonde District in Uganda and more specifically to understand, (1) the major drivers of environmental rangeland degradation in Lyantonde District in Uganda, (2) the ways in which Bahima pastoralists have been affected by environmental rangeland degradation, (3) the livelihood adaptation strategies of the Bahima pastoralists and (4) how local and central governments have been challenged in addressing environmental rangeland degradation. The field data collection exercise lasted a period of over six weeks and that was from 08/07/2015 to 22/08/2015 with the assistance of one researcher.

1.1 Problem statement

The different schools of thought ranging from the political, social, economic and ecological have influenced the decision making processes aimed at addressing environmental/ livelihood issues at all levels that is the local, national and the global. Various stakeholders thus need to be better informed of the linkages among the social, political and economic issues in relation to environment in order to formulate relevant policies and laws based on various research studies for the betterment of the people, environment and the society at large.

The Millennium Ecosystems Assessment (2005) reports that 60% of the ecosystems are degraded and are being used unsustainably hence threatening agricultural production, peoples' livelihoods and the environment. Rangeland degradation in Lyantonde District has not only diversely affected the pastoralists, but also other people using them as livelihood resources, biodiversity and the society at large. As a way of achieving sustainable development, the United Nations Summit adopted the post 2015 development goals that focus on natural resources sustainability, poverty, food and agriculture, climate change, water and sanitation among others. Goal 15 focuses on the protection, restoration and promotion of sustainable use of ecosystems, managing forests sustainably, combating desertification, halting and reversing land degradation and biodiversity loss. In order to achieve this goal, their proposed solution was that member states need to mobilise all resources to fund environmental activities and enhance global support so as to increase local communities' capacity to pursue livelihood opportunities (<https://sustainabledevelopment.un.org/rio20>).

The World Bank Group (2012) notes that much as most countries have adopted principles of sustainable development (refer to Rio declaration on environment and development) and agreed to international accords of environmental protection, the challenge has remained in reaching a comprehensive agreement pertaining the limitation of greenhouse gas emissions among other issues that embed environmental dimensions that are as a result of natural and manmade influences thereby leaving billions of people and future generations vulnerable.

In order to ensure the wellbeing/ livelihood sustainability of the growing population and the protection of the natural world, policy makers and other actors need to set clear objectives, develop and implement appropriate policies, laws and programs for the betterment of the people. However, the resolution of key issues concerning livelihoods and debates on ecological dynamics, appropriate policy and management strategies have been hindered by a number of factors in which the ecologists, social scientists, politicians among others have different points of view and this has been considered as an impediment in which response to natural resources (rangeland) degradation depends on whether the priority is on supporting livelihoods (pastoral) or preventing ecological degradation (Vetter 2005).

This study enabled me to investigate how the Bahima pastoralists, local and central governments have responded to environmental rangeland degradation in Lyantonde District in Uganda. Upon the completion and approval of this research study, it will provide a basis through which policy makers will formulate and implement the policies particularly related to rangeland issues since there are no definite policies on rangeland management particularly in Uganda. Though this process requires negotiations of different stakeholders at all levels.

1.2 Area of the research

Lyantonde District is located in the South-western region of Uganda and was the area of my research. Lyantonde District is located in the cattle corridor (refer to page 5 and 6). The District has one county named Kabula. The name 'Kabula' literally means scarcity in that the area is constrained due to scarcity of water, good soils, vegetation, rainfall to mention but a few for the human wellbeing, plants and animals. The District has six sub-counties namely Lyantonde Town Council which is also considered as a sub-County, Kaliiro, Kinuuka, Mpumudde, Lyantonde and Kasagama. Uganda has so many pastoral communities and these include the Bahima, Banyoro, Baruli, Itesot, Langi, Karamojong, Dodoth and Jie.

Emphasis was however on only Bahima of Lyantonde District. The reason was the Bahima are ethnic pastoralists within the Banyankole tribe and are mostly settled in South-western Uganda while other ethnic pastoralists are in other various regions of Uganda. The Bahima pastoralists have a strong attachment to their cattle and most keep the indigenous breed of the "Ankole long horn". My study concentrated on only four sub-counties that was Kinuuka, Lyantonde, Kaliiro and Kasagama because that is where livestock production activities are concentrated though the majority of the Bahima pastoralists are concentrated in Kinuuka and Kasagama sub-counties.

Lyantonde District had a population of 66,039 with 32,687 males and 33,352 females according to Uganda Population and Housing Census 2002, while according to Uganda Population and Housing Census 2014 provision results indicated 94, 573 total population with 46,703 males and 47,870 females hence depicting an increase of 28,534 people from that of 2002. The District largely depends on agriculture in which cattle keeping is the main economic activity. The District has over 83,700 livestock (<http://www.agriculture.go.ug>).

The area is characterized by low and highly variable rainfall conditions throughout the year, low vegetation cover, high temperatures most especially during dry seasons from June to August and from January to February. While from March to April and from September to December, rainfalls are heavy. However, due to climate change, seasons are no longer predictable. Climate change is also exacerbating rangeland degradation and the livelihoods of the Bahima pastoralists according to the research findings.

Map 2: Map of Lyantonde District (Area of study)



Source: Uganda Bureau of Statistics (2002)

1.3 Central research objective

The central research objective was to investigate how the Bahima pastoralists, local and central governments have responded to environmental rangeland degradation in Lyantonde District in Uganda.

1.3.1 Specific Objectives

The specific objectives were;

1. To understand the major drivers of environmental rangeland degradation in Lyantonde District in Uganda
2. To gain insights in the ways in which the Bahima pastoralists have been affected by environmental rangeland degradation.
3. To understand the livelihood adaptation strategies of the Bahima pastoralists.
4. To understand how the local and central governments have been challenged in addressing environmental rangeland degradation.

1.4 Central research question

The central research question was,

1. How have the Bahima pastoralists, local and central governments responded to environmental rangeland degradation in Lyantonde District in Uganda?

1.4.1 Specific research questions

More specifically, the research questions were,

1. What have been the major drivers of environmental rangeland degradation in Lyantonde District in Uganda?
2. In which ways have the Bahima pastoralists been affected by environmental rangeland degradation?
3. What livelihood strategies have the Bahima pastoralists adapted?
4. How have the local and central governments been challenged in addressing environmental rangeland degradation?

1.5 Significance

This study broadened various stakeholders' understanding of how the Bahima pastoralists, local and central governments have responded to environmental rangeland degradation in Lyantonde District in Uganda.

The realization of this research was to enable policy makers and other actors to not only make relevant policies that support people whose livelihoods are least sustainable in mostly in the south but also to implement them for the betterment of the people, environment and the society at large; though the formulation and implementation of programs, policies and laws that enhance livelihoods and environment embed the internal and external influences by various stakeholders there by hindering their formulation and implementation. Therefore linking research into policy making requires negotiating outcomes among various actors such as scientists, policy makers in government and donor agencies, local administrators, mass media, NGOs and local inhabitants (Leach and Mearns 1996).

Chapter Two:

2. 0 Theoretical / analytical framework

2.0.1 Sustainable livelihoods framework

Scoones (2009:171) notes that during the past decade, livelihood perspectives have been central to rural development thinking and practice. He therefore poses questions as to where these perspectives came from, their conceptual roots and the influences that have shaped the way they have emerged. He notes that livelihood perspectives date way back in the 1950s in which according to Fardon (in Scoones 2009), it was a collaboration of ecologists, anthropologists, agriculturalists and economists that analysed the changing rural systems and developmental challenges. He goes on to note that the livelihood perspectives did not come to dominate the development thinking but that modernization theories came to influence the development discourse (2009:173). He goes on to argue that progressive economists influenced the policy discourse rather than the rural developmentalists and the field based administrators because they offered a framing which embedded the micro and macroeconomics that were perceived to address the needs of that time. This approach has seen various studies with in different disciplines offering diverse insights in livelihoods from various perspectives (2009:174). Therefore I used this framework for my analysis because,

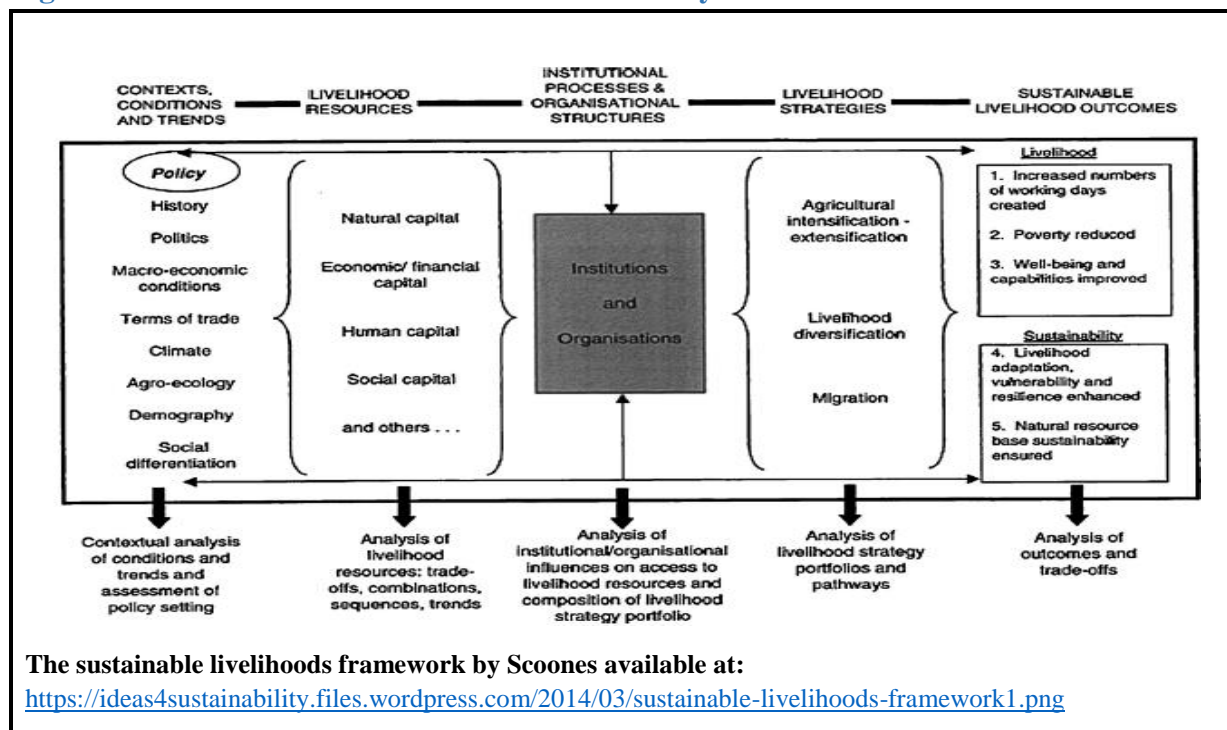
“Firstly, the approach is “people-centred”, in that the making of policy is based on understanding the realities of struggle of poor people themselves, on the principle of their participation in determining priorities for practical intervention, and on their need to influence the institutional structures and processes that govern their lives. Secondly, it is “holistic” in that it is “non–sectoral” and it recognizes multiple influences, multiple actors, multiple strategies and multiple outcomes. Thirdly, it is “dynamic” in that it attempts to understand change, complex cause-and-effect relationships and “iterative chains of events”. Fourthly, it starts with analysis of strengths rather than of needs and seeks to build on everyone’s inherent potential. Fifthly, it attempts to “bridge the gap” between macro- and micro-levels. Sixthly, it is committed explicitly to several different dimensions of sustainability: environment, economic, social and institutional”. (http://www.chronicpoverty.org/uploads/publication_files/toolbox-2.3.pdf).

Scoones (1998:7) notes that the term sustainable livelihoods is always subject to negotiation and that livelihood thinking carries with it explicit normative commitments that focus on capabilities and capacities rather than needs. Scoones (2009) notes that sustainability with in the livelihoods discourse referred to coping with immediate shocks and stresses where local capabilities and knowledge is enough once effectively supported. Adams (2003:367) notes that despite several strategies provided to ensure successful adaptation to environmental shocks and stresses, not everybody can adapt even when circumstances are kind. He goes on to note that sustainability is neither something that has formula and can be adapted through new and improved analytical structure, new planning procedures, new technology nor is it enough to promote development from

below (2003:363). Despite the concept of sustainability being challenged by a number of different scholars such as Christen and Schmidt (2012:403), they question how the quality of life of the poor people can be improved without undermining the possibility of the realisation of a decent quality of life later on. In line with that, I also question the criteria used to measure sustainability; is sustainability meant for short term or long term benefits and how short is short or how long is long? Whom is sustainability meant for? Christen and Schmidt (2012) further note that the concept of sustainability is normative and cannot be empirically proven but must be explored in rational discourse. Therefore according to Robinson (2004), sustainability is mainly a political issue. The complexity of sustainability demands analysis of different perspectives that require a great deal of political ideology. This therefore leaves dilemma in achieving the different development objectives at all levels.

The sustainable livelihoods framework was too broad for my research; hence choosing to analyse the policy section mostly the politics in relation to environment and livelihoods which needed to be unravelled, for the livelihood resources, I focused on mostly natural capital which constitutes of natural resource stocks such as water, soil, land and among others from which livelihoods are derived. For the institutions, I chose the local and central governments since they are crucial players in as far as addressing environmental/ livelihood issues. The livelihood strategies and the outcomes were inevitable for analysis; this is in a way that the strategies employed play an important role in determining the outcomes. This framework was backed up by various literature from other scholars.

Figure 1: The sustainable livelihoods framework by Scoones



2.1 Contexts, conditions and trends

The achievement of livelihood/ environmental sustainability is an outcome of different complex interactions among the ecological, economic, social, institutional and the political influences. The paradox of achieving environmental rangeland / livelihood sustainability is that formalization of property institutions is necessary in the protection of pastoral communities as far as production is concerned since there are varying competing land use practices that interfere with pastoral production. While at the same time, these property institutions undermine it through restricted mobility and sometimes this depends on the allocated grazing units and the political power of different stakeholders involved. The political trends according to Behnke (in Sayre et al 2013), many rangelands along the continuum have moved away from communal grazing and land tenure to more privatized systems and these political trends have economic, social, institutional and environmental implications embedded.

On the economic side, Scoones (1998) argues that the key criteria for assessing livelihoods is the poverty level. According to the World Bank (2011), poverty is defined as deprivation in the human well-being. Duraiappah (1998), notes that the predominant school of thought argues that poverty is the major cause of environmental degradation and that if environmental issues are to be addressed, then policy makers need to first tackle the problem of poverty. Using Environmental Kuznets Curve (EKC), the hypothesis explains that during the early stages of economic growth/ development when the country's income is low, the relationship between income and environmental degradation is positive until when a country reaches a certain level of economic growth/ development and the relationship between income and environmental degradation becomes negative. Therefore an increase in the country's income will increase public demand for better quality environment. This hypothesis has been tested by various scholars in different countries though the relationship has not been a straight forward one and more precisely, empirical literature on EKC for African countries remains relatively scanty (Omotor and Orubu, 2012). According to Duraiappah (1998:2174), he notes that the powerful and the wealthy degrade the environment only if there are institutional or market failures while the marginal groups degrade the environment only for survival. It is undoubtable that the rich have high consumption patterns and they put much more strain on the environment than the poor. According to Liu (2012), the concept of poverty is inadequate if linked with environmental issues and hence suggesting the creation of a new concept called environmental poverty which according to him is “the lack of an ecologically healthy natural resource base needed for society's survival and development”.

2.2 Politics and power

Scoones (2009) refutes the recurrent criticisms of livelihood approaches as ignoring politics and power. He notes that politics and power are indeed central to livelihood perspectives for rural development and that politics should not just be seen as context but rather as a focus for analysis. He notes that “power is everywhere- from contexts to constructions and access to capitals as mediating institutions and social relations, guiding the underlying choices of strategies and

influencing options and outcomes”. He goes on to argue that the underlying politics of livelihoods knowledge production has rarely been discussed and that the politics of knowledge and framing often gets kept under wraps hence subject to various interpretations. In linking politics and power to environmental degradation, Fallout and Talbot (in Homewood 2004:128) note that sub-Saharan rangelands are largely defined by international conventions where by individual nations are signatories to the formal environmental policies that are later on translated into national environmental management action plans. Environmental policy alignment is largely driven by donor conditionality and even when the recipient countries have their own priorities and needs, they have to abide by the conditions set thereby being silenced and this undermines their capacity to formulate and implement their own policies.

Political interests of different actors at the local, national as well as international have often played a role in contributing to environmental degradation which has taken toll on the majority of the rural poor who use the rangelands for their survival, therefore on the other hand the degradation of these rangelands has had both positive and negative repercussions on their livelihoods. Some actors will be in favour of economic growth and others environmental sustainability. Economic growth which is associated to industrialization has been linked to polluting the environment whereby industrial emissions into the atmosphere have contributed to climate change. Climate change has affected man by experiencing severe drought and floods. Climate change/ environmental negotiations require commitment from different parties involved, short of that, negotiations will become a song whose tune will be danced while people’s lives are perishing. On the other hand, halting environmental pollutions mostly in the south may undermine economic growth; therefore striking a balance between the two is rather a tricky scenario.

2.3 Livelihood resources

2.3.1 Natural capital

Scoones (1998) argues that livelihood resources once combined creatively and innovatively have the likelihood of creating more livelihoods and he cited an example of degraded lands being transformed through sharing knowledge, skills, resources and creating local economic linkages, that result into natural capital accumulation which in turn would offer more livelihood opportunities hence relieving pressure off the land. This means that the more livelihood opportunities one has, the lesser one largely depends on natural resources for survival.

Victor (1991: 192) notes that efforts to develop sustainable development indicators have been drawn upon the concept of natural capital by incorporating environmental considerations and modifying national account systems. Pearce and Turner (in Victor 1991:203), argue that natural capital stock maintenance in some circumstances such as rural setting in a developing country, implies that much capital which means more resilience to various shocks thereby leading to a more sustainable society that considers inter-generational equity demand. The maintenance of the

resource stock ensures broader equal access by different generations and preservation of natural capital. Natural capital are natural assets such as water, soil/ land and all living things. Natural capital is of importance to pastoralists in that their livestock largely depend on ecosystems for survival. Natural capital is not only an ecological liability, but a social as well as an economic liability to the pastoralists and everyone using the rangelands for their well-being. Water consumption is unevenly distributed whereby in developing countries, the average per caput consumption of water is 20-40m³. Therefore excessive water demand exerts pressure on both national and global natural resources. It is unfortunate that most vulnerable groups are located in marginal areas they are generally localized in nature and revolve around the use of natural resources that are already degraded hence threatening their livelihoods (<http://www.ifad.org/events/past/hunger/envir.html>). Pastoralists can both be protectors and degraders of rangelands.

2.4 Livelihood strategies

Scoones (1998), argues that people's ability to pursue various livelihood strategies largely depends on basic material and social, tangible and intangible assets which they possess. The proposed strategies were to (1) intensify/ extensify agriculture, (2) diversify livelihoods and (3) migration so as to ensure that rural people achieve sustainable livelihoods. Nomadic pastoralism which is a viable livelihood option to some pastoralists is rapidly vanishing and now many pastoralists are settled due to different government laws, policies and programs aimed at encouraging "development". Pastoralists are now grazing their livestock on the same piece of land year after year and this has already put pressure on the already degraded rangelands a case in point is of Lyantonde District. Pastoralists are embracing different adaptation strategies due to environmental problems. The livelihood strategy of herd mobility is being practiced in the District mostly during dry seasons by those with insecure land tenures while for intensification/ extensification of agriculture is now being embraced by pastoral households to ensure they have enough food for their families without necessarily depending heavily on livestock resources for their survival and for livelihood diversification, this is to ensure that pastoralists have various sources of income to meet their basic needs. The adaptation of different livelihood strategies varies from individual to individual and from household to household.

2.5 Institutional processes and organizational structures

Scoones (1998) argues that institutions whether formal or informal are fluid, ambiguous and are often subject to various interpretations by various actors. Davies (1996) defines institutions as social cements through which stakeholders are linked to access capital of different kinds as well as the means of exercising power that can lead to positive or negative livelihood adaptation. Institutions do not work on their own and there are indeed different actors that act on their behalf.

According to Agrawal (2010:178-179), institutional partnerships have become increasingly common in the environmental arena as far as development projects are concerned. Leach and Mearns (1996:25) note that African governments largely depend on foreign assistance for

environmental related activities and in order to attract funding, they have to comply with the environmental agenda set by donor countries and this undermines their perceptions and interests in addressing their own issues. Donor conditionalities leave the recipient countries with little or no say and this undermining a number of issues that would have otherwise been addressed. Leach and Mearns (1996:6) notes that ecological knowledge of rural people is in most cases silenced before being investigated. This implies that sometimes the persistence of ecological degradation is as a result of failure of addressing the pressing needs of various categories of people.

Within the institutional context, Agrawal (2008:28) notes that “Institutional functions are information gathering and dissemination, resource mobilization, allocation, skills development and capacity building, providing leadership relating to decision makers and other institutions”. Institutions have a vital role to play in all major sectors of the economy.

2.6 Sustainable livelihood outcomes

There are many meanings and interpretations attached to the sustainability concept. According to Chambers and Conway (1992:4), sustainability in environmental terms refers to the new global concerns with pollution, global warming, deforestation, over exploitation of non-renewable resources and physical degradation. Ellis and Swift (1988), note that the debates concerning sustainability were in response to the growing interventions that aimed at stabilizing spatially and temporally variable rangelands that were inappropriate and damaging pastoral livelihoods. While socially, sustainability refers to the maintenance and enhancement of local and global capabilities through which livelihoods depend on (Chambers and Conway 1992). Chambers (1986:10) further notes that,

“If immediate livelihoods are a priority of the poor, sustainability is a priority of the enlightened rich. Therefore the priorities of the poor and of the enlightened rich conflict in that the poor people have short time horizons that is from year to year, season to season and from day to day, all they need is to survive since they cannot afford the luxury of the long view and therefore sustainability is irrelevant to those who starve”.

Abiotic and biotic factors shape the livelihoods of people and biodiversity both in the short and long term. Abiotic factors are non-living elements and chemical in the ecosystem such as water, air, soil, sunlight and minerals while biotic resources include the lithosphere, atmosphere and hydrosphere while biotic factors are living organisms in the ecosystem such as plants, animals, birds and other micro-organisms capable of reproduction whose resources are from the biosphere. This implies that the sustainability of pastoral livelihoods and biodiversity within the environmental context largely depend on both biotic and abiotic factors. Ozone layer depletion due to atmospheric pollution has culminated into extreme floods, droughts that are as a result of climate change has further played a role in determining the livelihoods of people that depend on natural resources for survival.

Chapter three:

3.0 Literature review

3.1 Linkages between ecosystems and human wellbeing/ livelihoods

According to Raudsepp- Hearne et al (2010: 576), note that many scientists have linked the deterioration of ecosystems that provide a number of services such as (1) provisioning services e.g. crop, livestock, forest products among others, (2) regulating services such as climate change mitigation, regulation of floods, diseases, waste and quality water, (3) cultural services such as recreational, aesthetic, spiritual benefits etcetera and (4) supporting services such as soil formation, photosynthesis and nutrient recycling to deterioration of the human wellbeing. Yet according to the comprehensive study of the world's resources by Millennium Ecosystems Assessment (2005) showed that the declines in ecosystems have been accompanied by steady gains in the human wellbeing at the global scale. Raudsepp- Hearne et al (2010) further note that ecological degradation leads to the decline in ecosystems services that translate into fewer benefits for humans whose net human wellbeing would be possible under better ecological management. The Millennium Ecosystems Assessment (2005) further showed that 60% of the ecosystems services were found to have declined while at the same time, the consumption of 80% of the assessed services were found to be increasing and more so, the human wellbeing has been found to grow steadily for the past fifty years. According to Wackernagel in (Raudsepp- Hearne 2010: 576), the analysis of the global ecological footprint has already exceeded the amount of resources that can be produced sustainably by earth. There is indeed paradox in understanding the linkages between ecological/ environmental degradation and the livelihoods of people/ human wellbeing. Therefore linkages between sociological and ecological issues need to be investigated and more scholarly/ institutional research to be done a little bit further to untangle this paradox. This report showed how human wellbeing / livelihoods improved at the expense of the environment and yet ecosystems are depended upon by man. This indeed leaves paradoxical questions concerning the sustainability of these ecosystems.

3.2 Responses to environmental degradation

There are varying responses according to different schools of thought as will be analysed. According to Duraiappah (1998: 2174), "0.3 to 0.5% (5-7 million hectares) of the total world's arable land is lost annually to land degradation". In order to understand the problem of environmental degradation, there are different schools of thought that have varying ideas and my review and analysis was based on Clapp and Dauvergne's published literature.

3.2.1 Market liberalists

According to Clapp and Dauvergne (2005:4), market liberalists believe that economic growth and high per capita incomes are essential for the human wellbeing and the maintenance of sustainable development. They argue that economic growth (production and consumption) leads to the creation of higher incomes which in turn generates funds and political will that improves environmental conditions. Yet rapid economic growth has been linked to exacerbating inequalities between the rich and the poor. Different people address environmental issues differently depending on their motivations. Some believe that the poor are viewed as unconcerned or ignorant people that need to survive for example having enough food, build homes and earn a living which necessitates exploiting the natural resources around them hence being both victims and agents of environmental degradation. Furthermore, they note that the main drivers of environmental degradation according to the market liberalists is the lack of economic growth, poverty, distortions, market failures and weak policies (2005:5). As a way of improving environmental conditions, market liberalists call for policy reformulation, liberalisation of trade and government investment in major sectors of the economy, encouraging specialization and reducing government subsidies that distort markets and waste resources. Economic growth has also been associated with industrialisation which pollutes the environment by increasing greenhouse gas emissions into the atmosphere that contributes to climate change. On the other hand, the wealthy/ the rich have high consumption patterns than the poor thereby consuming far much more of the natural resources either for prestige or otherwise. Therefore market liberalist views of linking poverty to environmental degradation on the other hand are unrealistic because evidence ascertains that developed countries are the largest emitters of greenhouse gas emissions into the atmosphere a case in point is the United States of America. Climate change, poverty, wealth among others take toll on ecosystems whether in developing or developed countries.

3.2.2 Institutionalists

To the institutionalists, a lack of global cooperation is the main driver of environmental degradation where by ineffective cooperation partly arises from the nature of state sovereignty whose authority is defined according to its boundaries. Institutions have a crucial role of transferring technology and funds to the public and more importantly to the poorest parts of the world. According to Clapp and Dauvergne (2005), Institutionalists worry far more about environmental issues than market liberalists and therefore as a way of addressing environmental problems, there is need to strengthen institutions such as property rights and norms for the common good of the people. The institutionalists furthermore believe that internalizing principles of sustainable development such as institutional/ organisational bureaucracies in decision making will enable the management of economies and environments especially the common resources (Clapp and Dauvergne 2005:7-8). Organisational/ institutional bureaucratic tendencies sometimes discourage potential investors in major sectors of the economy.

3.2.3 Bio-environmentalists

To the bio-environmentalists, humans are anthropocentric and selfish animals who consume too much of the earth's resources and that indeed they have already over stepped the earth's carrying capacity. They note that deforestation, over fishing, biodiversity loss and climate change are environmental crises whose main driver is population growth and they draw their arguments from the ideas of Thomas Malthus (1766-1834). More so, human consumption patterns are as great as the problem of population growth and that these have already put strain on the already degraded and fragile ecosystems hence exacerbating environmental degradation. In order to address the problems of environmental degradation, there is need to curb down population growth through encouraging family planning programs in third world countries and curbing immigration to rich countries as well as consumption patterns which are rather high (Clapp and Dauvergne 2005:9-11).

3.2.4 Social greens

The social greens see social and environmental problems as inseparable. In so doing, they draw from various social and economic theories that are in place and are against industrialisation/capitalism since to them, capitalism is considered as detrimental to the livelihoods of the majority poor in that it exacerbates inequalities within and among states thereby reinforcing domination between the global rich and the marginalization of various social groups. This one the other hand motivates them to either strike a balance between achieving sustainable livelihoods or environmental sustainability. As such, this necessities a trade-off between the two which is rather a paradox to the majority poor as well as to states. To the social greens, major reforms are necessary and are rather far beyond just strengthening institutions or internalizing environmental and social costs in prices of traded goods. The solution proposed by social greens to environmental problems is to fulfil human basic needs and to enhance their livelihoods by promoting community autonomy, localization, empowering their voices and embracing indigenous knowledge rather than imparting western knowledge onto the local people that threatens their ecological knowledge (Clapp and Dauvergne (2005:11-16). In most cases, people know their ecological environment and have various ways of coping with environmental crises. More so, they have their own priorities and other needs that need to be addressed rather than thinking for them what is best.

Chapter four:

4.0 Methodology

Methodology refers to the systematic and theoretical analysis of methods that are applied to any field of study and involves different techniques some of which are qualitative or quantitative or both in nature. For purposes of this study, this was a purely qualitative research and purposive in nature. I was therefore not looking for representation. O’Leary (2014:10) notes that methodologies provide both strategies and grounding for conducting any research study. Some of these studies are scientific, ethnographic and action oriented that use quantitative, qualitative and mixed approaches. She further goes on to argue that “good research should be seen as a thinking person’s game”.

4.1 Targeted respondents and size

Since this was a purposive study, and not seeking representation, the targeted respondents were Bahima pastoralists, local and central governments. For local government, the officials were from Lyantonde District local government and these were the District Veterinary Officer (DVO) and the Environment Officer while for the central government, they were from the Ministry of Agriculture Animal Industries and Fisheries and these were the Director in charge of animal services/ Chief Veterinary Officer and the state Minister for animal resources. 30 pastoralists were from the sub-Counties of Kasagama, Lyantonde, Kinuuka and Kaliiro.

4.2 Data collection methods

Before embarking on data collection, I had to ensure that I had the necessary resources with me for example human, financial and physical resources. For the human resources, I had one research assistant who assisted me mostly in interviewing pastoralists. Given his level of education (graduate), I did not have to go through rigorous training but I rather gave him basic information pertaining the study and more so the interview guide for the pastoralists was self-explanatory. Financially, I was really challenged since the funds were not enough, I therefore worked within my means. For the physical, it necessitated me to have transport means and this was a motorcycle. I did not rent a motorcycle because I had one at home. In some instances, I travelled with my assistant from Lyantonde town Council to the chosen Sub-Counties to conduct the interviews according to the scheduled program. I borrowed the camera to capture pictures that were unable to be captured using my phone. Voice recordings were done using my phone as well as capturing other pictures.

Most of the pastoralists were interviewed from their farms while grazing their cattle except a few cases of those who were found in their homes. For those whose farms were unfamiliar, we sought for assistant from the area chairperson as well as other people who directed us accordingly. It was much easier to access the targeted district officials because they were my work mates, while for ministry officials, good enough was that their contacts were published online though some contacts

were not direct but required me to use several key words and their details were later on shown. Though scheduling an interview with some of them was a bit challenging.

Furthermore, I used semi structured interviews so as to get in-depth information pertaining the research study from key informants. Interviews with pastoralists were conducted in local languages such as runyankole and luganda while with the key informants, research was conducted in English. The use of semi-structured interviews enabled me to probe a little bit further for clarity in cases where the information given to me was a little bit quite vague and contradictory for example there was one respondent who noted that there was no environmental degradation in the area, yet what was observed was bare land with different degrading activities such as charcoal burning taking place. Semi-structured interviews enabled me to receive first-hand information which I could not have been gotten from other methods. Much as it was time consuming, it was worth it. More so with semi-structured interviews, there was flexibility and some questions were revised accordingly. Before embarking on research, I had a checklist of questions I wanted to explore. The revision of the questions was a little bit limited. There were also cases where conversation had to follow and this enabled the interviewee to express his / her thoughts freely though, conversation was also limited because I had limited time to engage in it. I did not need a translator because I understood the languages that respondents preferred to use so it was a matter of switching languages preferably to those spoken fluently by the respondent. Recording the field notes was done in English.

4.3 Data analysis

For primary data, field notes were taken and only significant statements extracted. For audio recording, permission was sought first. There were also scenarios in which the respondents declined to be recorded and I had to respect that. Audio recording helped me a lot since not all that was said by the respondent was noted and I had to re-listen to the audio recorded so as to be able to extract significant words that were spoken by the respondents. Photographs were captured to show various activities taking place with in an area and the landscapes as well.

Secondary data was obtained through the use of web based services. Web based literature published by different scholars was reviewed and this was coupled with other literature from textbooks that were obtained from the Institute of Social Studies (ISS) library among other sources. Organization/ Institutional websites such as UNDP, Ministry of Agriculture Animal Industries and Fisheries, Ministry of Environment and Water, Food Agricultural Organization among other websites that published scholarly literature were reviewed and analysed. Data was reviewed and analysed thematically and this included the analysis of words, concepts, theories among others pertaining the study. O’Leary (2014) notes that while many themes are inductively analysed, some can be identified through literature engagement, prior experience of the researcher and the nature of the research questions. The data analysed was mostly qualitative in nature.

Participant observation was also be used. In order to collect data, I mostly used direct observation. Much as direct observation was the primary method, I used other strategies such as photography and audio recording. This methodology on the other hand had limitations in that it was hard to observe one's behaviour within a short period of time. More so it is easier to forget details unless notes are quickly taken. According to Kaplan (in Jorgensen 1989), participant observation methodology is a process that is aimed at instigating generalization, concepts and theories among others and this requires flexibility in identifying a problem, study problems, concepts, theories and appropriate procedures in which data is collected and evidence evaluated. Therefore taking on the role of a participant observer, provided me with the means of conducting research without much obstruction. Theoretically, participant observation offers promising approaches in understanding different interplays in society though practically, it is rather not feasible due to the researcher's limited time and resources hence the application of this methodology was rather challenging thereby heavily relying on interviews and secondary data.

4.4 Ethics

An introductory letter was obtained from my supervisor before embarking on data collection for purposes of introducing myself to the respondents in case of any formal need by the respondents. There was actually one scenario where one pastoralist requested for a formal identification of myself before he responded to me. This was simple because I had the necessary copies with me. Given the importance of ethics while conducting research, ethical principles such as honesty, integrity, openness, respect for intellectual property/ views and confidentiality (keeping personal records secure) were observed while conducting the research. O'Leary (2014) notes that is the researcher's responsibility to ensure that the rights and wellbeing of those involved in the study protected at all times.

For purposes of this research, permission was sought from the respondents in order to cite them and for that matter record them. For respondents whose responses had sensitive information, I chose to remain anonymous for protection purposes. Since this research study was funded by Netherlands Organization for International Co-operation in Higher Education (Nuffic), this necessitated me to become accountable to the funders.

O'Leary (2014:47) notes that integrity in research is influenced by power and politics and therefore there is need for ethical and political awareness while conducting research. She goes on to note that it is the researcher's responsibility to make sure that he/she captures "truth" and reaches conclusions that are unbiased or not painted by error in his/her quest for knowledge production. This research involved a great deal of respondents of which most were co-operative and I was able co-ordinate them to ensure the success of the thesis in which knowledge production was paramount.

4.5 Limitations

Inadequate financing for the entire research exercise affected the whole research exercise given only the contribution of 850 euros by the Netherlands International Cooperation in Higher Education (Nuffic) and yet the whole exercise cost me more than that. Despite the financial constraints, I was able to get the required field information within a period of over six weeks that was from 08/07/2015 to 22/08/2015.

The weather was so sunny and the roads were really very dusty and I developed severe cough and cold which last for over a week. My health was really affected and I had to seek medical attention.

There is limited environmental data from institutional websites for example the ministry of water and environment in Uganda as well as Lyantonde District and other websites. I was therefore challenged in getting enough information concerning my area of study (Lyantonde District) and Uganda at large. Much of the literature cited was scholarly in nature. There is need to enhance their websites and improve on information dissemination since one of institutional roles is to disseminate information pertaining various programs, laws and policies.

More so the data collection process was marred with bureaucratic tendencies for example in accessing the relevant officials from various institutions particularly from the Ministry of water and environment and yet these are public officers that are supposed to be readily available to the general public. The same scenarios were also experienced with the ministry of Agriculture, Animal Industry and Fisheries but my patience and persistence paid off. This was a great hindrance to me while conducting research. Officials from various ministries are full of bureaucracy hence the need to reduce the bureaucratic tendencies if they are to deliver better quality services to the general public.

Chapter five:

5.0 Research findings, analysis and discussion

5.1 Introduction

This chapter will provide the research findings based on the research questions and will be thematically analysed and backed up by various literature from other scholars.

5.2 State of rangeland environment in Lyantonde District in Uganda

Benjaminsen et al (2001:682) note that environmental change at the local level is largely illegible using both lenses of dominant managerial and populist discourse. They note that most debates concerning environment and development issues are on deforestation, desertification, biodiversity utilization and climate change. The question of environmental rangeland degradation varied accordingly during the study. Several respondents noted that indeed there was a problem of environmental degradation in the district and most of the respondents had similar answers as to what had caused environmental degradation in the district. It is undoubtable that most rangelands in the district are already showing signs of degradation according to my observation and from people's responses. The findings ascertain that, environmental rangeland degradation drivers range from human activities such as cutting down trees for various purposes such as for firewood, charcoal, building and among others; climate change and other institutional factors such as government programs, policies and laws. Below were the research findings.

5.3 Drivers of environmental rangeland degradation

5.3.1 Human activities such as deforestation for other purposes

Having introduced myself and the reasons as to why I was carrying out this research, I asked one respondent if he really knew what environmental rangeland degradation meant. He responded by asking me back. Having given a brief explanation, below was his response,

“Cutting down trees for charcoal production is really a problem here in Kisaluwoko and supposing you tell people to stop cutting down the trees which is part of their source of income as well as for building houses, how do you expect them to support their families? Are you going to provide them with other sources of income, or if you tell them to stop cutting down the trees, then how are they going to build their houses?” (Aaron Niwataho, interview 8). Furthermore, Faith Busingye (interview 21) noted that charcoal burners are now so many and she also noted that the place where charcoal production takes place, the vegetation takes longer to grow.

According to Goudie (2013:6), notes that since the early 1970's, concerns about human impact have been central to so many disciplines and to the public and this has seen the development of various literature, legislation and international debates take place. He further notes that the study of global change which saw the establishment of International Geosphere-Biosphere program in

1986 by the International Council of Scientific Union was to describe and understand the interactive physical, chemical and biological processes that regulate the total earth system that provides life in which changes have been influenced by human activities.

“Humans have done much to transform the vegetation cover of the earth. From very early times, they have used fire to modify the environment. Also important has been grazing of domestic livestock. However, it is deforestation that has been the most potent cause of change. Humans have also modified or contributed to the character of some major biomes, including secondary forests, desert margins, savannahs, prairies, lowland heaths and Mediterranean shrubs” (Goudie 2013:26).

Picture 1: Charcoal production in Makukuru in Lyantonde District



Source: Author’s photo

According to Zulu and Richardson (2013:127), 80% of urban households in sub-Saharan Africa use charcoal as their main source of cooking energy whose demand is likely to increase in the coming decades. Charcoal is also the main source of income for rural households that have access to urban markets. Lyantonde town is near all sub-counties in the District and therefore most charcoal burners have easy access to the market for their charcoal.

Charcoal production undermines ecosystem service provision, agricultural production and human health. Charcoal production requires multi-faceted and integrated approaches on both the production and demand side. Much as charcoal production offers short term financial benefits to charcoal producers, this undermines ecological sustainability in the long run. There is minimal/weak implementation of policies governing charcoal production business across relevant sectors in Uganda. According to Zulu and Richardson (2013:153-136), note that in order to ensure effective charcoal regulation and trade, there is need for institutional capacity enhancement (financial, technical and human) and donor support thus emphasizing that “It is thus time for African governments to remove their heads out of sand and proactively reform charcoal policies and laws to promote regulated, sustainable production and trading of charcoal”. Though,

“Creating a world powered on clean energy to save ourselves from climate catastrophe is a central challenge of our time and requires a revolutionary transition in our economies. We cannot wait for our leaders to solve this problem; unless they feel serious public pressure, they will never go far enough or fast enough. Revolutions start with people, not politicians” (<http://www.theguardian.com/environment/2015/jul/29/peoples-climate-march-the-revolution-starts-here>)

Picture 2: Firewood for burning bricks



Source: Authors' photo

Much as some pastoralists mentioned that brick production contributes to rangeland degradation, the activities that go along with brick production are detrimental to the environment in that they involve cutting down trees and pasture/ vegetation and yet some of these tree species and vegetation are useful. According to, *Faith Busingye (interview 21)* noted that “*Emirama*” and “*emisisa*” are very good tree species and when they are in a certain place, that place never dries up and these tree species provide shade for both pastoralists and cattle. “*Emirama*” and “*emisisa*” also provide milk gourds such as “*ebyanzi*”, “*ebishaabo*” among others. “*Emburara*” provides very good pasture for cows and sometimes when people burn the pasture and cut down trees, the cattle suffer because of too much heat from the sun since they do not have enough shade and pasture to feed on and some cattle mostly die in dry seasons because of unfavourable conditions”. More so, she noted that people need to be taught the value of these tree species and pasture and stringent laws should be put in place for those that cut down trees for other purposes such as brick production, charcoal among others.

Benjaminsen et al (2001: 691) noted that according to the research findings carried out in Gourma region in northern Mali in Africa, most of the wood used by households are collected from dead trees and that these are a consequence of rainfall fluctuations and the occurrences of frequent droughts in the Sahel. Therefore, whether the collected wood are from dead or living trees, these trees have various benefits to both man, biodiversity and the environment at large.

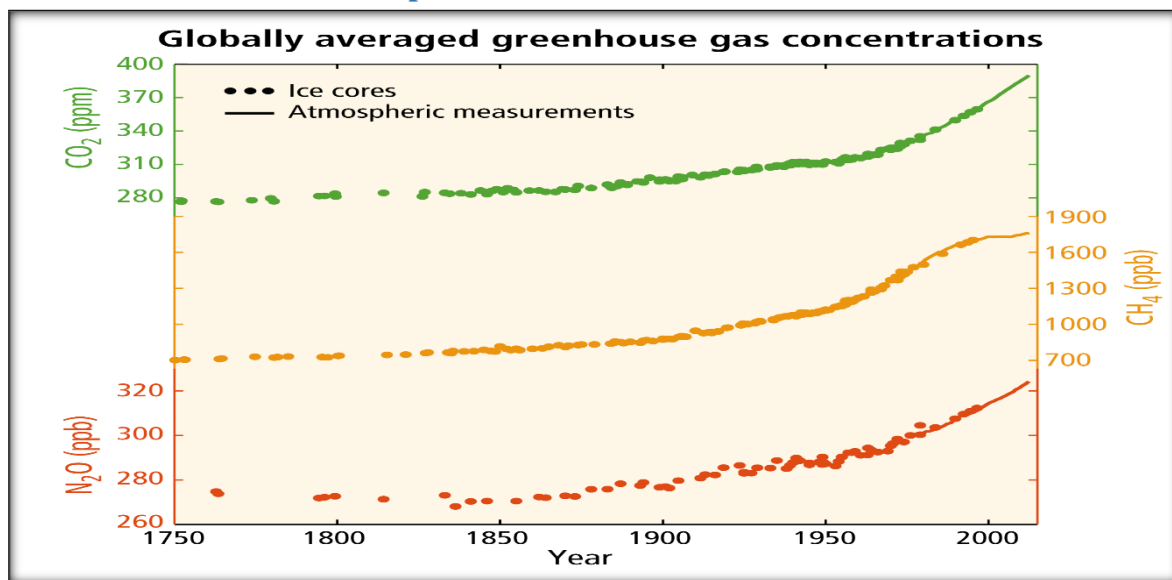
5.3.2 Climate change

Climate change was another driver of environmental rangeland degradation in Lyantonde District. There has been severe drought for the past three years and in 2009, there was severe rainfall coupled with lightning and thunderstorms killed some people, animals and destroyed people's houses, plantations and the district had to seek assistance both financially and in kind from the central government, NGOs and even business community to help offer some relief to the affected households.

Human development report (2014) noted that between 2000 and 2012, more than two hundred million people mostly from developing countries were affected by natural disasters such as floods and drought. Some pieces of land are now bare and sometimes when it rains, it washes away top soils hence severely degrading the land. In order to systematically understand the complex subject of climate change, the scientific community divided the problem into two such as climate forcings and climate responses where by a forcing is a change in energy output from the sun while responses are the results of the forcings whose reflections are in temperatures, rainfall, extremes of weather, sea level among others (Seinfeld and Pandis 2012:1999).

IPCC fifth assessment (2014) reports that the past and recent drivers of climate change are increases in anthropogenic greenhouse gas emissions (GHG) into the atmosphere which has been as a result of pre-industrial era, largely driven by economic and population growth for the past 800,000 years. The cumulative concentrations of carbon dioxide, methane and nitrous oxide into the atmosphere have caused global warming that has diversely affected the planet earth such as the natural and human systems.

Figure 2: Steady increases of carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) concentrations into the atmosphere since 1750



Source: http://ar5-syr.ipcc.ch/topic_observedchanges.php

The IPCC (2014) reports that the question of whether climate change affects the natural or human system has changed to rather statistical data whose attribution quantifies the linkages between the observed change and human activities. The report ascertains that “it is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by anthropogenic increase in GHG concentrations and other anthropogenic forcings”. According to Food Agriculture Organisation (in Gerber 2010), the dairy sector emitted 1,969 million tons of CO₂-eq [± 26 percent] in 2007 where by 1,328 million tons and were attributed to milk production, 151 million tons to meat from culled animals, while 490 million tons from fattened calves. Furthermore, the global dairy sector contributed to 4% of the total global anthropogenic greenhouse gas emissions [± 26 percent]. Therefore the estimated total of anthropogenic emissions from global milk production, processing and transportation was ± 26 percent.

Benjaminsen (2001:699) notes that major climate change impacts will be on poor developing countries due to lack of technology and resources to cope as a result of floods or severe drought conditions. Government should plan well in advance for all natural calamities that are likely to occur and devise means of addressing these natural disasters since prevention is better than cure. In order to understand environmental issues, this needs to be analysed in broader contexts through considering trade-offs among competing economic, social and environmental objectives.

Picture 3: Overview of the bare rangeland in Kakibandi



Source: Author's photo

Scoones et al (2013:12) note that landscapes that have lower slopes collect more water and soil than upper slopes. Whereas upland fields cease to provide the returns because of declining rainfall or degradation, the lower lands become increasingly attractive for production. Upper rangeland slopes according to the research findings already show evidence of degradation and some are no longer yielding the necessary pasture on which livestock depend while lower slopes are being cultivated thus affecting pastoralists. One pastoralist mentioned that people who occupy lower slopes on these rangelands are mostly cultivators and some of these rangelands have now been converted into agricultural lands so as to ensure food security for all people within the household, community and the entire world. Pastoralists in Lyantonde District are challenged in that squatters prefer to do agricultural activities on these rangelands such as cultivation for food production because some soils are more fertile than others and as such, pastoralists have to devise means of enclosing their lands to prevent cattle from destroying people's gardens. They are fined once cattle destroy their gardens hence conflicts between pastoralists and cultivators.

5.3.4 Government laws, policies and programs

5.3.4.1 Land tenure reforms

Land tenure is a legal term that is used to mean the right to hold land rather than a simplistic fact of just mere land holding (Bruce 1998:1). He further goes to note that tenure reform differs from land reform in that the latter involves land holding redistribution and agrarian structural change while the former leaves people to hold the same land though with different rights (1998:2). Land tenure reform is an institutional factor that embeds environmental dimensions. Kisamba-Mugerwa (1998) notes that "Uganda has never had a definite policy towards common property resources and the introduction of private property regimes and lease hold tenure systems have resulted into mounting pressures on the available natural resources". The lack of definite policies pertaining rangelands has contributed to their degradation as per the research findings. One pastoralist noted that in the 1980s and even before that, there were no problems of environmental degradation. The place was fertile and the pasture was adequate for the cattle. People would move around with their cattle and would not degrade the environment since they would be rotated around in different places in search for water but people nowadays need land security to ensure they graze their cattle on which that piece of land is grazed year after year thereby leaving the land unproductive.

Lambin (2010) notes that land transition affected many countries. Official land ownership regimes have transitioned from open access or informal communal regimes to more formal government owned or private owned lands where the government owned lands are effectively being managed by local communities as common property resources or by private enterprises. He notes that changes in land ownership regimes are major drivers of land use transitions in rangelands. The land use transitions have contributed to both degradation and development. The tragedy of the commons theory by Hardin (1964) argues that communal land systems are incapable of managing land effectively as herders desire to expand their livestock holdings that will ultimately destroy the range through grazing. This implies that herders have unrestricted access to the commons and are motivated to maximise their herds, therefore the tragedy is inevitable. However many schools of thought have come to believe that Hardin confused communal property to open access including

Elimor Ostrom. According to Bruce (1998: 3,5) notes that common property refers to the commons from which the community can exclude non-members so as to control its use while open access has none to control the resource and anyone can use the available resource in question. Makukuru rangeland in Lyantonde District is more of an open access resource and the structures in place need revitalisation.

5.3.4.2 Sedentarisation

Sedentarisation is being encouraged by government to ensure that pastoralists live a sedentary life in order for “development” to take place. According to Wurzinger et al (2009:1154), the Sedentarisation process is being supported by politicians so as to enforce “development” and that to the policy makers, settlement is seen as a condition to development. Pavanello and Levine (2011), note that policy makers link pastoralism to backwardness and poverty whose solution is sedentarisation of pastoral communities. They note that if pastoralism is to contribute to national economies, institutions need to manage natural resources properly, allow mobility and recognise customary institutions without eroding rules and practices that weaken pastoral livelihood systems.

Much as government is encouraging sedentarisation of pastoralists, Korf et al (2015:11) notes that the sedentarisation logic is rather creating intra generational conflict in which younger pastoralists express preference of diversification towards a more sedentary life style while older pastoralists decry this as the erosion of people’s culture and tradition. Korf et al (2015:16) notes that sedentarisation is not purely a state driven process but rather a process of land appropriation which is increasing the commodification of different pastoralist land based resources. The sedentarisation process embeds social, political, economic, institutional and environmental issues; so it should therefore not be seen using only one lens. Sedentarisation of pastoralists can only be facilitated if pastoralists have ownership, access and control to livelihood assets and most especially natural resources since most pastoralists move with their cattle when they are faced with water shortage and pasture declines mostly during dry periods.

Much as sedentarisation is being embraced by government, according to the research study carried out in Kenya, 80% of pastoral households that practiced mobility were generally better off than those living a sedentary life. While in Ethiopia, evidence points to livestock being more at risk by succumbing to drought conditions (Nassef et al 2009). The sedentarisation of pastoralists is rather affecting pastoral livelihoods much as it is seen as a pre-condition for the so called “development”. Hence conflicting realities between government policies and people’s lifestyles.

5.4 Effects of environmental rangeland degradation

5.4.1 Vulnerability and exposure to risk

Human development report (2014) notes that human vulnerability is not new and that most people across the world are vulnerable to some degree to environmental catastrophes. Though some people are more vulnerable than others. The report indicates that more than 2.2 billion people are either living near or in multidimensional poverty where by 12% (842 million) of the global population suffer from chronic poverty. Charcoal production increases vulnerability and exposure

to risk in that it contributes to environmental degradation through deforestation for various purposes and this increases greenhouse gas emissions into the atmosphere further exacerbating climate variability which threatens the sustainability of ecosystems and livelihood opportunities of people using rangeland resources. Charcoal production affects human health through inhalation of smoke that affects the lungs and can contribute to death in the long run.

The vulnerability of individuals or communities increases more with the unavailability of resources as well as entitlement to them. When I asked about the effects of charcoal production to the pastoralists, *one respondent noted that “it affects us because when trees are cut down, the vegetation dries up and land becomes bare and this affects animals because they depend on this vegetation/ pasture for their survival hence yielding poor quality animal breeds which means that there is low milk production and less income through the sale of animal breeds and this affects our livelihoods due to inadequate financial capacity to feed ourselves and the family”*. Vulnerability of pastoralists is severe during dry seasons than rainy seasons and everyone is vulnerable and exposed to risk either directly or indirectly.

5.4.2 Community / individual livelihood system destruction

Brooks (2006) notes that historically, pastoral livelihoods in Sahel depended on negotiations with agriculturalists concerning access to water and land use. Agricultural expansion on historically marginal rangelands has resulted into failure of appreciating nature’s long term climatic variability in Sahel hence leading to community and livelihood system destruction as well as massive disruption of social issues at all levels while to Kandji (in Dong et al 2011:9), agricultural expansion strategy for food production has further led to land resource deterioration in many areas in the Sahel caused by overgrazing a certain piece of land which follows fallow disappearance and pasture declines. Pasture declines mean poor livestock breeds implying low milk and meat production. On the issue of overgrazing, Honorable Bright Rwamirama (interview 1), noted that grazing the same piece of land year after year does not necessarily lead to degradation but rather it is overstocking since the available land cannot sustain the many numbers of livestock hence overwhelming and degrading the land resources available on that piece of land.

5.5 Adaptation strategies

Debates about adaptation have been in relation to indigenous people in which their knowledge has important positive roles in as far as adaptation contexts are concerned. According to Smit and Wandel (2006:286), adaptation with in the climate change context is usually associated with concepts of vulnerability and adaptive capacity. Adaptation is considered as local and community based adjustment in which changing conditions with in broader political, social, political contexts are addressed (2006:288). The adaptive capacity as well as the vulnerability level largely depends on the availability of resources/ assets, knowledge among others and this varies among different people depending on cultural features, practices of production, socio-economic and political contexts that necessitate people to adjust their livelihood strategies due to an altered environment coupled with changing water flows (Kronik and Verner 2010:160-163).

Benjaminsen et al (2001: 699) note that institutions which have social capital functions determine the vulnerability and adaptive capacity of people. Agrawal (2010:2174) notes that historical experience and knowledge about adaptation strategies are crucial to future policy formulation and efforts to address environmental issues can help to enhance the rural poor people's adaptive capacity as well as examine their adaptive responses and institutional roles in as far as facilitating adaptation. Agrawal further notes that the argument in relation to institutions, adaptation and livelihoods is based on comparative static analysis where environmental changes are not taken into account and that institutions are not static entities since they are likely to change due to political interactions among decision makers. Furthermore, all efforts to adapt to environmental change by pastoralists, are local in nature and most of them embed institutional arrangements since adaptation does not occur in an institutional vacuum.

Mearns and Norton (2010:21), note that more than 2 billion people (90%) in developing countries live in rural dry lands characterized by high climate variability and are susceptible to climate change and these communities are the most world's poorest and these include pastoralists, agro-pastoralists etcetera. The livelihoods of poor people and social institutions have been inherently oriented towards climate adaptation by embracing various adaptation strategies.

5.5.1 Technological adaptation strategies

Pastoralists are embracing some of the technological adaptation strategies like water saving technologies because of climate change impacts that are affecting their livelihoods. This is mostly to address the problem of water scarcity. The International Institute for Environment and Development (2009) notes that sometimes it is difficult to distinguish top-down adaptation strategies as well as bottom up adaptation strategies such as water storage since it is hard to divide water meant for daily domestic purposes and for addressing other environmental crises.

According to *Peter Kanabugoye (interview 28)*, “*there is nothing much I have done so far; just like the way the day comes and night goes that is how life is, now what do you want me to do?*” while to *Miriam Byenjeru (interview 22)*, noted that “*I decided to put a well since it was near the swamp so that my cattle can have access to water but my neighbours instead use that water for domestic purposes despite its quality. Much as I put a well near my kraal, that water is not enough and they still move long distances to access water on a daily and this is rather so tiresome for my workers, cattle and even to me*”.

Water storage is one of the adaptation strategies of the pastoralists and this is to ensure that their cattle have access to water. Water shortage is a challenge to pastoralists and they have to devise means of overcoming it. Some dig wells, the well-off pay the required fee to the District to access tractors to construct dams and others use other sources of water such as rain water harvesting tanks, taps, boreholes etcetera for domestic purposes rather than feeding the animals because of economic implications. In the context of human rights approach, the Human Development Report (2006) ascertains that water for life is a fundamental human right but millions of its most vulnerable people across the world live in areas that are subject to water stresses. Water for livelihoods poses a different set of challenge. The report recommended further focus on strengthening support to

people's adaptation strategies in the face of environmental crisis and called for further multi-lateral action in addressing different environmental/development issues.

One pastoralist noted that *"I wanted to construct a dam but the district prices for hiring the tractor were very high for me and I decided to devise other means but of course other means such a well, rain water harvesting tanks are not even enough to provide water for all the cattle and for other domestic use on a daily basis, but at least I get some water"*. As a way or renting government tractors to people, formal processes have to be undertaken and this embeds bureaucracy and for poor pastoralists/ agriculturalists who do not have the money to pay to the district end up devising their own means. Below are the water sources constructed by one pastoralist and government respectively in Lyantonde District.

Picture 4: A hand dug well on a private rangeland in Kakibandi in Lyantonde District



Source: Author's photo

This is the well that was dug near the kraal and it is being used by both man and animals despite its quality. This ascertains that indeed there are water stresses in various parts of the world. It is therefore very essential for government to put into consideration the various needs of the people.

Picture 5: A dam constructed by government on a rangeland in Makukuru in Lyantonde



Source: Author's photo

This dam in Makukulu was constructed by government five years ago and it involved a great number of stakeholder consultations from the ministry, district, sub-county and the local people. This dam is being accessed by everyone and there is a management committee in place. One respondent noted that much as there is a management committee, it has not played its role. Different users blame the pastoralists for letting their livestock step in the dam and this poses health risks such as cholera, dysentery, diarrhoea, bilharzia and other water borne diseases despite the central government having fenced around the water source to protect it. People removed the fence and everyone including animals can now access the resource. Makukulu rangeland is more of an open access resource because the management committee has been challenged due to political structures in place.

5.5.2 Social adaptation strategies

Social adaptation strategies mostly fall under bottom-up adaptation strategies and these include behavioural changes. These strategies are aimed at empowering communities to use their own knowledge and make decisions that address their own issues such as behavioural change. Behaviour occurs as an interaction of different conditions such as one's capability which entails the psychological and physical ability, motivations some of which are reflexive and automatic and opportunity which thrives on the physical and social environment. Hence, pastoralists' behaviour changes with changing environment and as such, their adaptation strategies during drought conditions is to embrace mobility among others.

5.5.2.1 Herd mobility

Faith Busingye, (interview 21) noted that in 2014, I had to take away my cattle to my friend since I could not let my cattle die because of drought. Herd mobility is another strategy that some pastoralists adapt in response to environmental crisis in Lyantonde District. According to Agrawal (2010:183), herd mobility is the most adaptive strategy that is seemingly the natural response to environmental crisis and is a way of life for some social groups in semi-arid areas and it has been the long standing mechanism in response to spatial and temporal rainfall variations and range productivity.

There are restrictions attached in as far as practicing this adaptive strategy as it embeds institutional arrangements most especially when boundaries are crossed whether within or outside the district. It requires one to have an animal movement permit and other related documents issued by the DVO. This is to curtail animal theft, diseases etcetera. Pavanello and Levine (2011) note that pastoralist' animal mobility within states have become more restricted by districts and this implies overgrazing of certain pieces of land which are already degraded there by affecting pastoral livelihoods. Mearns (1996) notes that rotational grazing has the likelihood of increasing yields and reducing the effects of trampling of a certain piece of land in which animals are kept.

5.5.3 Institutional adaptation strategies

Local institutional adaptation strategies are mainly meant to reduce people's vulnerabilities to environmental crises etcetera and thus institutional arrangements encourage people to change their lifestyle by embracing various livelihood options. Institutional arrangements are mostly in response to supporting local initiatives, financially, technically or otherwise.

5.5.3.1. Diversification

According to one pastoralist, she noted that "I had to diversify my livelihood since 1992 because I realized that cattle alone was not enough to feed my family and I have now different economic activities that I carry out for example I have my small business in Lyantonde (cosmetics shop) and sell milk on a daily basis. I planted pine and eucalyptus plantations not because I wanted to address environmental problems but to get income for my family through selling timber. Actually livelihood diversification is very good because I do not have to suffer so much in case I do not get enough yields from my cattle since there is back up support somewhere".

Anderson et al (2010:206), note that coping strategies are sometimes adaptation strategies depending on different seasons throughout the year and these strategies both aim at reducing people's vulnerability to climate shocks. Livelihood diversification according to Hussein and Nelson (1998), refers to attempts by individuals and households to find alternative ways of earning income both on and off farm activities in order to reduce environmental risks. Agrawal (2010) notes that diversification varies in relation to productive and non-productive assets, employment opportunities etcetera where by diversifying households embeds institutional arrangements in order to facilitate their transition into new livelihoods as natural resources provisioning services

decline. Therefore creation of employment opportunities, asset transfers, asset building, micro finance, livestock restocking, training and skills enhancement among other livelihood programs offer some relief from pressure off the land. Heltberg et al (2010:269) note that, if the resilience of poor people is to be built, then there is need to have access to assets and employment. The livelihood assets of pastoralists include human (education, health, etc.), natural assets such as land for grazing their cattle, community social support, while the physical assets include livestock herds, infrastructure and financial assets include livestock, credit among others.

People's adaptive strategies and capacity are undermined if they have no ownership, access and control to those livelihood assets. Some pastoralists are embracing afforestation programs according to the research findings and this strategy offers ecological restoration. Those embracing afforestation is mostly by those with land titles. The wealthy ones are more likely to diversify and embrace different livelihood options than the poor members of the community. Though all in all, diversification offers both short and long term benefits for the willing members.

Picture 6: Tree planting on a private rangeland in Kakibandi Lyantonde District



Source: Author's photo

Tree planting offers different benefits such as the social, ecological, economic and political. Accordingly to Bryant and Bailey (2005:56-59), note that much as states encourage afforestation programs, they rarely see activities that degrade or conserve the environment as an end in itself but rather as institutional interests and that is why third world states have contributed to environmental degradation through policy incentives that rather privilege economic development than conservation. More so, they note that the establishment of eucalyptus plantations has been swift due to the growing global demand for pulp and paper that has been driven by the industry to supply wood from major third world producing countries.

As a way of addressing environmental problems, afforestation and reforestation programmes have been encouraged by many academic institutions, governments among other scholars for many varying reasons and therefore as we continue to hold negotiation meetings on climate change between developing and developed countries, we should keep in mind that it is not about keeping humans alive and well but also the capacity in which the environmental resources / ecosystems can support both the human and non-human beings. Sachs (in Wapner 2002:168) notes that what is wilderness to someone, is home to another and what is valued as endangered species to some, it is dinner to the other or even a threat or potential income to another. Hence projects meant to conserve or protect the environment need thorough research since there are varying viewpoints concerning environmental issues.

5.5.3.2 Agricultural intensification/ extensification

Some pastoralists are now converting part of their land to do arable farming by intensifying agriculture for example through establishing banana plantations and cultivating various crops such as maize, beans, cassava among other crops all in the name to securing food for their families. This was rather unheard of in the hima culture. Intensification of agriculture embeds the application of fertilizers and pesticides which have negative consequences on the environment and raises questions of economic and environmental sustainability in that the inputs used have consequences on the quality people's lives/ livelihoods. Carswel (1997) notes that a more sustainable agriculture incorporates nutrient recycling, greater application of local knowledge, minimization of external and non-renewable inputs.

Picture 7: A banana plantation on one of the rangelands



Source: Author's photo

A pure muhima pastoralist never engaged in cultivation and was seen as an activity for the “bairu” people and it was really unheard of and to see a muhima pastoralist engaging in cultivation because of their culture. They largely depended on meat, milk and milk products as food and income, but now a days some pastoralists have plantations through which food is obtained. This show transitions in the way of living which is being driven by modernization/ modernity. The traditional life styles of various social groups are changing with changing environment. One agro-pastoralist mentioned that,

“Due to modernization that comes along with different scientific methods of farming, most government officers teach us to intensify and adapt new breeds of cattle so as to benefit from them. But I for one, I don’t like the Friesian breeds of cows because you spend so much on them and you do not benefit a lot from them. They get so many diseases easily and need to be fed a lot which is so expensive for me. I tried to buy some but again I had to sell them because I was really over spending. I rather buy cross breeds (a breed of traditional cows and Friesian cows or just traditional cows (Ankole long horned cattle) because they rarely fall sick despite producing less milk but at least am no longer on pressure like when I had the other Friesian cows”.

According to Kronik and Verner (2010:155), people’s knowledge systems are based on experimenting with nature that contains a stock of knowledge which is developed over time and passed through generations. In addition to that, much as most institutional roles are to transfer knowledge through sensitizing local people on better farming methods, there are times when the knowledge transferred may or may not be applicable to certain places either due to the topography of an area or depending on economic/ financial capacity of the people. Having asked the district technical officer about pastoralists’ view of saying that the local breeds are resilient to environmental crises, he noted that a thorough assessment of the environment and the introduction of new breeds to a certain place is first done by the technical people to ascertain whether they will adapt to the environment or not and later alone, this follows sensitization of people about the different animal breeds; so the issue of resilience was rather refuted by one technical officer. Intensification of agriculture according to Carswel (1997), thrives on a number of factors such as the agro-ecological environment, policy environment, access to technology, information among others.

5.6 Challenges encountered by both local and central governments in addressing environmental rangeland degradation and their solutions.

5.6.1 Land tenure insecurity

Land tenure security is associated with property rights and these help regulate access to resources and exposure to risks. Much as property rights help to regulate access to resources and exposure to risk, not all people have secure land tenures. Furthermore, Dong et al (2011:10) note that changing property rights and livestock management on rangelands have been challenged by the traditional practices used by pastoralists to achieve sustainable pastoral livelihoods. People who do not own land may wish to migrate their cattle because of so many varying conditions and may wish to take an opportunity of looking for land that has better pasture and water for their animals.

One pastoralist noted that *“I left Kanyareru in Kiruhura District in 2013 because I did not have land for my cattle and I got an opportunity and came to Lyantonde District to try my luck. I came to Makukuru after being informed by a certain friend of mine about that land. I have been able to graze my cattle but the local government put charges which I managed to pay in one year but I was unable to pay the following year and right now, I do not pay any money to government though I know it is illegal. The pastoralists who have their own land do not move around but for us, we are always on move. In case of anything, we are at God’s mercy”*.

According to Agrawal (2008:12), much as privatization of land increases tenure security and encourages land owners to invest in territorial infrastructure improvements, land under open access on the other hand during dry seasons enables livestock owners who are challenged by tenure security can take opportunistic advantages and migrate to areas where forage is available. Rangeland privatization and open access have lowered institutional capacity to respond to crisis in which the disappearance of formal regulatory institutions and weak customary institutions have increased agro ecosystems degradation thereby increasing the herders vulnerability in terms of socio-economic affluence (Dong et al 2011:10).

Honorable Bright Rwamirama (interview 1), noted that property rights are indeed problems now a days to governments and sometimes people do not want to provide their land so that development projects are embarked on such as dam construction, borehole drilling, road construction among other projects and government cannot intervene in the management of private lands and that sometimes there is always a lot of resistance in providing land since some fear losing their land. On the other hand, as a way of curtailing animal movements, government is encouraging sedentarisation of pastoralists and it has provided tractors to districts though concentration has been in the neighbouring districts of Kiruhura and Sembabule while for Lyantonde District plans are still under way to ensure that they also have chance to utilize them.

The central and local governments are challenged by property rights in as far as implementing “development” programs. For those who own land, conditions are attached if “development” projects are to be implemented and sometimes the money quoted as compensation by the land owners is far much more than what government or even the community members can contribute. The success of the projects largely depends on the land owners and this affects people’s adaptation strategies in one way or another. As a way of addressing the challenge of property rights, one ministry official as well as one district technical officer noted that, people need to be sensitized because the “development” projects embarked on by government benefit the communities as well as the land owners.

5.6.2 Inadequate financial resources

“Inadequate financial resources is a constraint encountered by both local government for example, the natural resources department approximately receives five million Ugandan shillings almost every financial year from the central government to carry out environmental activities and it is the least funded department at the district. Sometimes we are not funded adequately to carry out our duties such sensitising people on environmental issues in the district” (interview 30). This is rather absurd that there is no any organisation that funds environmental issues in the district, most organisations fund social issues.

This also explains why there is environmental degradation in Lyantonde District. This challenge faced by the local government is being addressed through proposal writing and submitting them to relevant authorities for consideration where for example various community projects in the district have been funded by United Nations Development Program under Sustainable Land Management (SLM). Other projects like the Lake Victoria Environmental Management Projects (LVEMP), some districts have already benefited and Lyantonde District is yet to be on board. The environment officer noted that there is need to increase the district natural resources budget by the central government in order to address environmental issues. The challenge of inadequacy of funds cuts across both local and central governments according to the research findings.

The IPCC synthesis report (2014:26), on the other hand reports that many adaptation and mitigation strategies can help to address the environmental impacts but no single option is sufficient by itself hence effective implementation of policies will depend on co-operation of different actors at all levels that is local, national and global levels. Sometimes people co-operate when they are going to benefit for example from different development programs in which corruption finds its way for the faint hearted leaders. The inadequacy of funds might not necessary be a very big challenge but rather the management of the “so called inadequate funds” to finance various activities. According to Bryant and Bailey (2005:59), note that corruption among senior political leaders has often been a political factor that has hindered the achievement of a more balanced approach to environmental issues in developing countries. On the issue of corruption, much as Uganda has laws in place that convict culprits, the implementation of these laws is still so weak mostly in developing countries and as such, there is need to address governance and management issues in all government departments if we are to achieve environmental and livelihoods sustainability.

5.6.3 Cultural/ traditional practices

Despite different government programs being introduced to enhance better farming methods, some pastoralists are still tied to their cultures/ traditions that interfere with government programs which are meant to improve people’s livelihoods and environment. Much as animal movements and overstocking have greatly reduced in Lyantonde District, some pastoralists still move around with their animals in search of water and pasture during dry seasons and others still believe in stocking many numbers of cattle mostly in the hima culture for various reasons. A muhima pastoralist who has many numbers of cattle is considered the wealthy one and other people do not mind about the few who have less but quality breeds. It is undoubtable that the many numbers of cattle on a small piece of land leave much ecological degradation than those who stock less breeds of cattle on the same piece of land because of too much trampling.

On the issue of overstocking, one respondent (interview 35) noted that the question of overstocking is rather tricky though quick to add that it depends on the richness of vegetation/ the fertility of the soils of that place and therefore one cannot say that one acre of land is enough for certain number of animals though he also noted that cattle numbers have to be considered depending on the land available. This actually left me with more questions concerning stocking levels. Ellis and Swift

(1988) note that sub-Saharan African state policies are framed under the assumption that overstocking of rangelands by pastoralists leads to environmental degradation whose management strategies aim at controlling, modifying and obliterating pastoral traditional systems. Leach and Mearns (1996:13) note that rangeland degradation was perceived as being caused by destructive farming systems that were introduced by white settlers but that evidence rather ascertains that it is the nature of the stability of grasslands within a given period of time. Lambin et al (2001:264), note that despite several advances in rangeland ecology, the misconception that rangelands are natural entities is still held by management specialists who view the absence of human impact as triggering significant changes within climate epochs and yet rangelands are also a functional part of semi natural ecosystems thus both human and biophysical impacts are drivers of rangeland degradation.

5.6.4 The use of fire

The use of fire is challenge that cuts across the pastoralists, local and central governments. Some people use fire to modify the environment. One respondent noted that NEMA as well as other concerned organisations/ institutions have not done enough in as far as addressing their concerns for example *“now this is a dry season and they have burned down part of my farm and I reported to the concerned officials but nothing much has been done. There are also cases when the affected party reports to the police, and those people who burn down the farms after being reported, go and bribe those officers and the file is not properly handled and there are other cases when police officials wants evidence which is rather hard to get since one may not know who burnt down the farm. My cattle are suffering so much because of pasture inadequacy. There was one dry season when my three cows died and I did not have much to do. I therefore request government to do the needful in far as the issue of burning down people’s farms is concerned”*.

Goudie (2013) notes that fire was the first and most powerful tool used by man to transform the environment and that evidence ascertains that fire plays an important role in the formation of various vegetation types and influences ecosystems. Some people believe that once the grasslands are burnt down, new and better pasture will grow and that more rains will fall. Controlled burning is partly beneficial and harms the soil due to high temperatures that damages it physically and chemically. Government as well as pastoralists lose revenues due to low quality yields from agricultural/ livestock products. This challenge is being addressed mostly by the the local government through sensitizing people on the dangers of burning down grasses.

Picture 8: A burnt down farm



Source: Author's photo

5.6.5 Heterogeneity

Development projects aimed at improving livelihoods and environment are interfered with because communities/ people are heterogeneous and therefore what might be a priority for one person or one social group or country might not be a priority for another.

5.6.4.1 The “wealthy” versus the “poor”

Studies that link poverty and environmental degradation have been mostly in developing countries. Both the poor and the wealthy people whether in developing or developed countries degrade the environment. If poor people want their livelihoods enhanced, their solution would be the utilisation of the natural resources for example cutting trees for various purposes and this offers them short term relief which in the long run affects programs meant to conserve or rehabilitate the environment. The wealthy degrade the environment through the use of different production technologies that embed ecological footprints.

Richard Nuwagaba (interview 12) noted that, *“You cannot stop someone from cutting trees on their farms but for me I do my role and I do not allow people to come and cut down trees but remember, environmental effects have no boundaries, what affects one person, affects the other and therefore the actions of those people really affect me even when I do what is required”*.

According to Zulu (2013:130-131), notes that for the past four decades, sub-Saharan Africa has undergone several changes in which the integration of fuel wood issues into national economies and poverty alleviation policies have focused on the enhancement of fuel wood supply, management of demand and market interventions and less on poverty alleviation and environmental sustainability thus policies being inadequate. People use rangelands and receive different ecosystems services for example provisioning services such as land for grazing their livestock, collection of forest products among others and therefore it is important to understand complex interactions between ecosystem services, human activities as well as the wellbeing. *One pastoralist also mentioned that the effects of rangeland degradation varies and gave an example of someone who grazes five cows is affected differently than one with over 100 cows and from the five cows, he has to get income to feed the family and educate the children while one with over 100 cows cannot be affected the same way and yet on these rangelands we also carry out other agricultural activities.*

The urge for food security, good education, health among other needs are escalating environmental degradation in the wealthy have higher consumption patterns that put much more pressure on the existing natural resources thereby quickly depleting the resources that would have also otherwise been utilized by poor communities in the long run for their daily survival. Unless poverty alleviation is made the priority for the poor and sustainability for not only the rich but the poor as well, environmental problems will continue to escalate in both developing and developed countries.

5.6.4.2 “Local people” versus “institutions”

Sometimes government programs aimed at raising revenue for district or sub-County operations to ensure implementation of development programs are always sabotaged by local people; for example the district council approved rental charges for use of government lands but the implementation has been hindered due to political intervention. The top leaders at both the district and sub-county level determine who get access to these lands and the questions of when, where and for what reasons are always borne in mind in that some activities that are detrimental to the environment require assessment by technical officers whereby corruption finds its way for the faint hearted leaders when allocating land for use.

The disgruntled members of the community resort to uncooperativeness when it comes to implementation of government “development” projects that do not favour them and some seek solace from top leaders. There was actually one scenario where a certain disgruntled pastoralist burnt down his grass thatched house and went to report to police that he had been burnt by one technical officer and his team while on duty yet the truth was that he was against payment of rental charges and fearing that failure to do so would lead to his eviction. Several meetings were held to ensure that harmony exists between the government and the local people using government’s land for their survival. There are various procedures through which government follows to evict people from their lands. Some politicians are really very hard to understand, for they say one thing and mean the other. The political structures in Lyantonde District have played a bigger role in hindering the implementation of some “development” projects that are meant to benefit different social groups, the environment and the society as a whole. Some government programs, policies and laws

are neither implemented nor adhered to hence hindering the achievement of sustainable development.

5.6.4.3 “Cultivators/ other users” versus “pastoralists”

Cultivators/ other users and pastoralists have conflicts amongst themselves in Lyantonde District. This is in a way that pastoralists whose lands are not enclosed, their animals stray and destroy people’s gardens and as such cultivators report to relevant authorities to ensure they are compensated for the damages made. Pastoralists and cultivators/ other users have never lived in harmony because pastoralists have to ensure that their cattle move around to have access to water and pasture and in such moments, their cattle stray and destroy people’s gardens. The destruction of people’s gardens means livelihood destruction since crops are grown seasonally and sometimes as a way of paying back to pastoralists whose cattle destroy people’s gardens, they burn down their pasture so that they also suffer losses. Others actually believe that once they burn down the grasses, then more rainy seasons and better pasture are on the way since my assumption is that no pastoralist would burn down pasture on his/her farm. Charcoal burners also cut down these trees on people’s private or communal lands to ensure they earn a living from them and this affects the pastoralists who would have otherwise prevented them from cutting down the trees on their farms.

5.6.4.4 “Local people” versus “migrants”

Migrants mostly occupy the rangeland in Makukuru and there are times when the local people question who give these migrants land to do various activities on this “communal”/ government land. Some of these migrants are relatives of top leaders at the district and therefore there is nothing much one can say because they are influential people. Local people decry of water sources destruction since the people share the same water source with animals. The pastoralists let their cattle step in the water source and the management committee hardly does anything to address the problem. Despite several meetings to address the problem and to ensure harmony in the community, this has not gone down well with the locals.

In conclusion, the capacity of third world countries to address livelihood and environmental issues has been constrained due to a number of issues such as weak institutional capacity, inadequate financial resources, limited technological availability, low education levels and yet the adaptation measures to environmental crises include long term planning for a number of issues such as water storage and supply, land use management, agricultural diversification etcetera to avoid maladaptation which embed the political, social, economic and ecological implications. Unless these issues are addressed, the attainment of both pastoral / other users’, sustainability of both livelihoods and the environment will remain constrained.

Chapter six:

6.0 Conclusions

My central research question of “How have the Bahima pastoralists, local and central governments responded to environmental rangeland degradation in Lyantonde District in Uganda?” enabled me to analyse a number of issues ranging from the political, social, economic and ecological from a local, national and international perspective. Much as I used the sustainable livelihoods approach which is popular, its promotion has raised a number of paradoxical questions with in different disciplines such as the political, economic, social, ecological among others across the world in as far as achieving livelihood sustainability without compromising the environment. This approach enabled me to analyse a number of issues, though translating it is not a simple practice because it embeds inherent organizational forms, disciplinary biases and various ways of interpretation. It is therefore upon this that there are policy and research implications embedded.

For policy implications, politics and power have shaped almost every development agendas, projects etcetera across the globe and therefore livelihood perspectives create potential conflicts at different interfaces among the macro, meso and micro levels. Thus policy makers need to make better informed and unbiased decisions while formulating and implementing policies and programs for the betterment of the people, environment and the society at large since policy formulation and implementation goes far beyond setting goals and procedures.

For research implications, there is need to adopt broader livelihood perspectives that focus more on peoples’ needs rather than presenting opportunities or offering solutions that have been shaped by different actors at macro, meso and micro levels. Livelihoods perspectives also go far beyond social concerns hence the need to adopt various lenses of analysis.

In response to the central question, the Bahima pastoralists have responded in a number of ways to environmental degradation in Lyantonde District in Uganda. From the livelihoods perspective, environmental issues have been influenced by humans for survival in that their activities such as deforestation for various purposes, climate change, government programs, policies and laws have been influenced largely by institutions thus the Bahima pastoralists’ responses to the degradation have been in form of adapting to environmental catastrophes by embracing various livelihood strategies most of which embed institutional arrangements. This means that nothing much has been done by the Bahima pastoralists in Lyantonde District in as far as addressing environmental issues apart from embracing a few livelihood strategies such as herd mobility, diversification and agricultural intensification/ extensification; all in the name of securing better livelihoods and not necessarily addressing environmental issues.

Environmental concerns are mostly global in nature such as climate change, deforestation, etcetera while government programs that address environmental issues embed international influences. This leaves the local communities at the mercy of the powerful and influential actors in various institutions/ organisations both at the local, national and the global. Hence politics and the use of

power are always at play concerning decision making via planning, formulation, budgeting and implementation of various projects, policies among others that either enhance livelihoods/ environmental sustainability or otherwise.

Responses by the local government to environmental rangeland degradation have also been largely influenced by the central government in that much of the district funds are from the central government and there is little or none that the district does apart from depending on remittances from the central government to execute its duties. This largely constrains the implementation of “development” programs at all levels. Financial implications impede the addressing of environmental as well as livelihood issues since the two are interconnected. Though the inadequacy of funds at the local and central governments may not necessarily be the problem per se but the management of these so called “inadequate funds”. Hence the need to address financial management issues that interfere with the implementation of various development programs and policies.

From the central government perspective in response to environmental degradation, the formulators and implementers of the policies and laws have also been tied down by the laws they formulate such as the land laws where by it was evidenced according to the research findings that now a days, government heavily relies on the land owners to implement their projects since they have less or no land and they cannot intervene in the management of people’s private lands thus policy makers need to adopt broader lenses of foreseeing into the future than focusing on problems which arise there and then which might have short term benefits. The central government on the other hand largely depends on donor agencies to address mostly environmental issues this means that they have to abide by the rules set by the donor agencies which leaves them with not much say as far as addressing environmental issues.

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Appendix i

I am Allen Komuhangi, a student from International Institute of Social Studies doing my master's degree, in The Hague, Netherlands and an employee of Lyantonde District Local Government. Am carrying out a research study on environmental rangeland degradation in Lyantonde District. The interview is intended to get responses from you. I kindly request you to provide me with the information since this is for academic reasons. Thank you.

INTERVIEW GUIDE FOR BAHIMA PASTORALISTS

Names of the respondent:

Date of interview.....

Location.....Date.....

1. Could you kindly give me a brief background about yourself?.....
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2. Do you think there is a problem of environmental rangeland degradation? If yes, what are the drivers of environmental rangeland degradation?
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3. In which ways have you been affected by environmental rangeland degradation?
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4. What adaptation strategies have you put in place?
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5. Do you think NGOs and government are doing enough to address rangeland degradation? If yes, what have they done?

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6. What would you recommend NGOs/ government to do to ensure that your livelihoods are enhanced?

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7. Do you have any suggestions/ recommendations?

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THANK YOU FOR YOUR CO-OPERATION AND TIME.

Appendix ii

I am Allen Komuhangi, a student from International Institute of Social Studies doing my master's degree, in The Hague, Netherlands and an employee of Lyantonde District Local Government. Am carrying out a research study on environmental rangeland degradation in Lyantonde District. The interview is intended to get responses from you. I kindly request you to provide me with the information since this is for academic reasons. Thank you.

INTERVIEW GUIDE FOR KEY INFORMANTS

Name of Organization represented.....

Name of the respondent.....

Location.....Date.....

Position/ Designation of the respondent in the Institution
.....

1. What do you think are some of the factors hindering the achievement of environmental rangeland sustainability in Uganda?

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2. Do you have any institutions/ organizations working on environmental issues in Uganda particularly in Lyantonde District? If yes, what have they done?

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3. Do you think Government / NGOs have contributed to both environmental rangeland degradation as well as their protection in Uganda? If Yes, how?

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4. What challenges have you encountered in as far as addressing environmental rangeland degradation in Lyantonde District in Uganda?

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5. How have you addressed the challenges above?

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6. What would you recommend pastoralists to do to ensure that rangelands are not environmentally degraded?

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7. Do you have any comments/ recommendations?

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THANK YOU FOR YOUR CO-OPERATION AND TIME

Appendix iii:

List of respondents

No	NAMES	DATE OF INTERVIEW	DESIGNATION	COMMUNICATION MODE	LOCATION
1.	Bright Rwamirama	8/07/2015	Hon. State Minister for animal services	English	Ministry of Agriculture Animal Industries and Fisheries, Kampala
2.	Anonymous	12/07/2015	Agro-pastoralist	Luganda	Katebe, Kasagama
3.	Benon Katungi	12/07/2015	Agro-pastoralist	Runyankole	Kisharuwoko, Kasagama
4.	Sezi Mujuni	12/07/2015	Pastoralist	Runyankole	Makukuru, Kaliiro
5.	Twewanyisa	12/07/2015	Pastoralist	Luganda	Makukuru, Kaliiro
6.	Anonymous	13/07/2015	Agro-pastoralist	Luganda	Kasagama
7.	Ephraim Tumusiime	13/07/2015	Pastoralist	Runyankole	Kasagama
8.	Aaron Niwataho	13/07/2015	Pastoralist	Runyankole	Kisharuwoko
9.	Deo Seta	14/07/2015	Pastoralist	Luganda	Lugala, Kaliiro
10.	Godfrey Bangyana	14/07/2015	Pastoralist	Runyankole	Gayaza L.C 1, Kaliiro
11.	John Mugisha	14/07/2015	Pastoralist	Runyankole	Lugalama A, Kaliiro
12.	Richard Nuwagaba	14/07/2015	Agro-pastoralist	Runyankole	Gayaza
13.	Benon Asiiimwe	16/07/2015	Pastoralist	Runyankole	Bwamuramira, Kinuuka
14.	Colleb Ainemabazi	16/07/2015	Pastoralist	Runyankole	Kinuuka
15.	Julius Arinaitwe	16/07/2015	Pastoralist	Runyankole	Kinuuka
16.	Justus Musinguzi	18/07/2015	Pastoralist	Runyankole	Kanchebebe, Kaliiro
17.	Patrick Rwabwoojo	18/07/2015	Pastoralist	Runyankole	Makukuru, Kaliiro
18.	Winfred Nuwagaba	18/07/2015	Pastoralist	Runyankole	Kanchebebe, Kaliiro
19.	Klesensia Kato	07/08/2015	Pastoralist	Luganda	Kyenshama

20.	Phoebe Mbabazi	07/08/2015	Agro- pastoralist	Runyankole	Kyenshama, Kinuuka
21.	Faith Busingye	07/08/2015	Pastoralist	Runyankole	Kyenshama
22.	Esther Okugumaho	8/08/2015	Pastoralist	Runyankole	Makukuru, Kaliiro
23.	Leo Kasibante	8/08/2015	Agro-pastoralist	Luganda	Makukuru, Kaliiro
24.	Geofrey Kigani	8/08/2015	Pastoralist	Runyankole	Kisharuwoko, Kasagama
25.	Ronald Agaba	8/08/2015	Pastoralist	Runyankole	Katebe, Kasagama
26.	Vincent Owamani	8/08/2015	Pastoralist	Runyankole	Kasagama
27.	Moses Serugo	11/08/2015	Pastoralist	Luganda	Kinuuka
28.	Peter Kanabugoye	11/08/2015	Pastoralist	Luganda	Kinuuka
29.	Robert Kidibirigye	11/08/2015	Pastoralist	Runyankole	Kyenshama
30.	John Mary Ssekamatte	12/08/2015	Environment Officer	English	Lyantonde District Headquarters
31.	Miriam Byenjeru	12/08/2015	Pastoralist/ business lady	Runyankole	Kakibandi
32.	Anonymous	12/08/2015	Agro pastoralist	Luganda	Kakibandi
33.	Edward Ssekawojwa	13/08/2015	District Veterinary Officer	English	Lyantonde District Headquarters
34.	Paul Mwambu	15/08/2015	Program manager	English	United Nations Development Program- Kampala
35.	Kauta Nicholas	22/08/2015	Chief Veterinary Officer/ Director of animal services	English	Ministry of Agriculture Animal Industries and Fisheries, Kampala