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Dry Land Pastoral Water and Land Management in Northern Kenya

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By Hedvig Helldorff and Jackson Lemuna
Swedish University of Agricultural Sciences
Department of Urban and Rural Development,
Rural Development and Natural Resource Management.

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Supervisor: Dr Karl-Johan Lindholm Department of Archaeology, Uppsala, Sweden

Supervisor: Christopher Ondieki Kenyatta University Nairobi, Kenya

Examiner: Professor Nadarajah Sriskandarajah, Department of Environmental

Communication, Dept of Urban and Rural Development

Swedish University of Agricultural Sciences, Sweden

E-mail address of the authors: hedvig_helldorff@hotmail.com, jacklemuna@yahoo.com,
<http://epsilon.slu>.

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SUMMARY

This paper discusses the dry land pastoral water and land management in the Samburu District by using the notion of key resources and the Integrated Water Resources Management (IWRM) Principles. In the Samburu District the majority of the inhabitants derive their livelihood from pastoralism. Their food production and income are based on the welfare of animals and the availability of water and pasture. The key resources are the persistent water and pasture found during dry periods and droughts as located in the landscape. There are also hand-made water points that constitute key resources during the initial phase of a dry period. The whole pastoral community is arranged around the management of the key resources. The management is coherent with the social structure of the community where elders, owners of cattle and young warriors are responsible for location and decision making regarding the resources. The pastoral community in Samburu perceives that drought, conflict and privatization are the current changes threatening the availability of key resources. The understanding of the dry land pastoralism water and land management must be based on the concept of key resources and the IWRM principles. The four principles of IWRM were water is seen as integrated with the surrounding landscape, as a vulnerable and limited resource and with a social and economic value with vulnerable users as part of a research, are suggested to frame a more appropriate research design.

Key words: dry land pastoralism, Samburu, equilibrium and non-equilibrium, ASALS, pastoral key resources, Integrated Water Resource Management

ABBREVIATIONS

ASALs – Arid and Semi Arid Lands

GWP – Global Water Partnership

IWRM – Integrated Water Resource Management

MDG – Millennium Development Goals

NRM – Natural Resource Management

UNDP-United Nations Development Program

SIDA – Swedish International Development Agency

WSSD-World Summit on Sustainable Development

Table of Contents

	Page no
CHAPTER ONE: INTRODUCTION	8
1.1 Water as a basis for living	10
1.2 Pastoralism	12
1.3 The study area	14
1.3.1 People in the Samburu Highlands	14
1.3.2 History	18
1.3.3 Samburu District and the nature of arid environments.....	20
1.3.4 Livelihoods in dry lands	22
CHAPTER TWO: DRY LANDS PASTORALISM.....	24
2.1 Equilibrium, carrying capacity and non-equilibrium	24
2.2. Pastoral key resources	28
CHAPTER THREE: RESEARCH DESIGN	29
3.1 Aim of the study	29
3.2 Fieldwork and Methods.....	33
3.2.1 Participant Observation	33
3.2.2 Interviews	34
3.2.3 Semi-structured interview	35
3.2.4 Open-ended interview	35
CHAPTER FOUR: DEFINITIONS OF TERMS	36
4.1 Traditional	36
4.2 Conflict.....	36

4.3 Privatization	36
4.4 Selection of cases	36
CHAPTER FIVE: FINDINGS	38
CHAPTER SIX: GENERAL DISCUSSION	43
6.1 The pastoral livelihood and its dependence on water	43
6.2 The concept of key resources	44
6.3 Indicators of key resources.....	48
6.4 Pastoral management of key resources	54
6.5 Conflict Resolution Mechanisms	56
6.6 Current changes affecting the key resources	56
CHAPTER SEVEN: CONCLUSION AND RECOMMENDATIONS	60
7.1 Conclusions	60
7.2 Recommendations	60
REFERENCES	62

List of Figures

Figure 1 Samburu District (Red area) is located in Northern Kenya. Source: Republic of Kenya, Samburus District of Development Plan 1997-2001.	15
Figure 2 Lorroki Division is located in South West Samburu. Source: Republic of Kenya, Samburus District of Development Plan 1997-2001, (Government Printer).	16
Figure 3 The traditional parliament, the Naapo, is placed in the centre of the ritual settlement, <i>ankang</i> . The ankang is the complex of <i>manyattas</i> , the traditional hand build huts.	17
Figure 4 The typical landscape in Samburu is characterized by low and thin vegetation cover, few mountains and vast plains. Photo: taken between Suguta Marmar and Maralal, Samburu, 2009.	21
Figure 5 During the wet season the vegetation resources are abundant due to rainfall and can the climate can be temporally suitable for agriculture. Photo: Taken in Samburu District, 2009.	23
Figure 6 During dry periods and the recurrent droughts with no rains agriculture cannot be practiced. Photo: Taken in Samburu District, 1996.	23
Figure 7 An equilibrate environment has a carrying capacity level which makes the ecosystem to be disturbed when it is reached. Source: zebu.uoregon.edu/2004/es399/lec10.html Available 2010-09-06.	26
Figure 8 Buffalos surrounding a key resource that is an equilibrated room, within the dry land, or non-equilibrium landscape.	27
Figure 9 <i>The study is undertaken through an Integrated Water Resource Management (IWRM) approach.</i>	32
Figure 10 The community settles down close to key resources	39
Figure 11 The general hierarchy of the community clearly defines roles in the key resources management	39
Figure 12 Monthly rainfall mm/month and year between 1995 and 2000 in Samburu District. Source: Samburu District Meteorological Office, 2006	42
Figure 13 Monthly rainfall mm/month and year between 2001 and 2006 in Samburu District. Source: Samburu District Meteorological Office, 2006	42
Figure 14 One of the dams in Lorrora village constituting a key resource during the initial phase of a dry period and a drought	46
Figure 15 The acacia tree is characteristic for the landscape in dry lands and an indicator of key resources. Photo: Taken in Samburu District, 2010	49

Figure 16 The baobab tree contains water persistent during dry seasons and is a key resources indicator. Photo: Taken in Samburu District, 2009.....	50
Figure 17 Drainage lines are indicators of water as a key resource. Photo: Taken in Samburu District, 2009.....	51
Figure 18 Thick grass is favoured by animals during dry seasons and indicates availability of water. Photo: Taken in Samburu District, 2009.	52
Figure 19 Animals grazing near a water point (tree line in the background). Pastoralists track the footprints and know that water can be nearby. Photo: Taken in Samburu District, 2009..	53
Figure 20 The current changes affecting key resources are drought, privatisation and conflict.	59

CHAPTER ONE: INTRODUCTION

1.1 Water as a basis for living

Access to safe water is fundamental for all aspects of life. It is essential for poverty reduction, agriculture, and health development, for food, energy production and recreation¹. Water is vital to local livelihoods and a key prerequisite for socio-economic development. Dry-land pastoralists, or mobile livestock herders (see below for definition and discussion), are heavily dependent on safe access to water sources, of various scales, for their subsistence. It is estimated that 1.1 billion people lack access to safe water supplies² and in Africa only 50 % population has access to piped water. Lack of fresh water intimidate people's social and physical health and is closely related to diseases and poverty³. Water scarcity is a threat especially in developing countries, where water demand is greater than the supply⁴. Despite its importance, water is rarely seen as a resource in the same manner as many other natural resources⁵. This may be since regions, which are economically, and politically strong and set the agenda do not lack access to safe water; they rather focus on other natural resources with more economical value such as oil. Its lack of economical value sets water aside from other natural resources which have a more given contribution to a nation's economy.

The dependence on water is more conspicuous in least developed countries (LDC), defined by United Nations as being the most poor and vulnerable countries in the international community⁶, where the livelihood is based on the access to water sources in the landscape. Dry land pastoralists' dependence on water for food production makes it the most important natural resource and it must be considered to have a high socio-economic value. Water scarcity in dry lands should be understood and addressed due to its importance for the livelihood of local citizens.

Our aim is to better understand dry land pastoral water and land management by understanding the pastoral key resources (we will define and discuss this concept below). The

¹ Newson, 1992

² Coles & Wallace, 2005

³ World Health Organization, 2003

⁴ Coles & Wallace, 2005

⁵ Ibid

⁶ United Nations, 2010

dry land pastoralism is dependent on key resource areas and to understanding the practice associated with these places is crucial for understanding the fundamental principles for pastoral land and water management. The Integrated Water Resource Management (IWRM) concept emphasizes on the five Dublin principles that were presented at the World Summit in Rio de Janeiro 1992.⁷ As master students at the IWRM programme at the Swedish University of Agriculture (SLU) we will conduct our study from an IWRM approach and apply and extend our previous knowledge on it. Our interest is to understand the water management in a pastoral community where we emphasize on the communication and platforms for decision-making. Our pre-understanding is that it is linked to land use and the integrated use of land and water is a key concept of IWRM. We will thus base our fieldwork on the IWRM principles. The first principle is that water is a finite and vulnerable resource and essential to all kinds of life, for development and for the environment.⁸ This is a fundamental principle, which should underlie all kind of research on water. We see water as a key resource and expect it to be the most important natural resource in the pastoral community, in relation to land. The second principle emphasizes on a participatory approach of all stakeholders, involving vulnerable groups of the population. A problem with pastoralists is that they have been marginalised as a group according to their specific livelihood. We consider the pastoralists as a vulnerable group and with our study we want to understand the water from their point of view. Women play a key role in collecting and safeguarding water for domestic and agricultural purposes and their role should be acknowledged. We see their role in the pastoral community as an important part of the pastoral system. We however limit our study to the part of the pastoral community that is directly involved with the livestock keeping, namely men. We thus make an exception from this third principle of IWRM, yet we are aware of women's role. Pastoralists are highly dependent on the welfare of their cattle as their solely livelihood which also make them vulnerable (principle two of IWRM). The dependence on water gives it an economic and social value, which is the fourth principle of IWRM. When we go into the situation to learn about the water and land management, we consider the water as a basis for the social and economic welfare. Principle five recognizes water as an integrated part of the ecosystem whereby its use should be considered as related to other natural resources. Our study does not consider the whole dry land ecosystem, but we are limiting it to consider

⁷ Global Water Partnership A, 2010

⁸ Ibid

the water and land use together since we understand them as the most important natural resources in the pastoral community.

In this thesis we will focus on pastoral livelihoods in northern Kenya. Kenya is not considered a LDC but the northern part has the highest number of recurrent droughts and considerable higher poverty level than the rest of the country.⁹ The region has been historically marginalised in resource allocation and infrastructural development¹⁰. The dry land pastoralism is highly dependent on finding and managing water resources and pasture, especially for the dry season. An IWRM considers waters as fundamental for maintaining life and also regards it as the vulnerable resource it is, e. g. it is a finite resource which is limited during dry seasons. The pastoral landscape use is in itself integrated and must be understood from an IWRM perspective. This allows us to understand the water as fundamental (for the livelihood) and integrated with other natural resources (land). It has a social and economic value (related to the livestock) and our study considers a vulnerable group (the pastoralists).

1.2 Pastoralism

There is an abundance of definitions of pastoralism depending on the ecological, cultural, ideological or social context that is taken into consideration. Here we will point out some general characteristics that have been noted for pastoralism.

In general, pastoralists are people who herd domestic livestock and depend on livestock herding as a livelihood strategy. Worldwide pastoralism supports between 100 and 200 million households¹¹ mainly living in areas that can be considered as marginal environments not suitable for agriculture¹². Pastoralists appear in different parts of the world¹³; in Asia (the Mongols), in Northern Scandinavia (the Saami) and in Africa (the Samburus, the Maasais, the Kalenjin and the Zulus etc.). Pastoral practices may differ according to the climatic context and the preconditions for animal herding and cultivation. Generally, they have adapted to environmental constraints by maintaining low population densities, high mobility and flexibility and complex information sharing systems concerning the availability of pastures

⁹ Republic of Kenya, 2010

¹⁰ The Kenya Human Rights Commission, 201

¹¹ Davies & Guyo, 2010.

¹² Humanitarian Policy Group, 2009

¹³ Food and Agriculture Organisation of the United Nations, 2001. Davies & Guyo, 2010.

and water.¹⁴ Nomadic pastoralists move with the livestock from one place to another searching for pasture and water. They have developed strategies to monitor and share information about the landscape, e.g. the properties of soil, pasture and water.

Nunow¹⁵ provides an ecological definition of pastoralist, defining them as people who keep domestic livestock which eat natural forage rather than conserved fodder or concentrates¹⁶ and base their income or sustenance on them. The ecological definition of pastoralism implies the conversion from forage to meat and milk by using domestic animals¹⁷.

Pastoralism can include only the people who base their entire livelihood upon livestock¹⁸ but it can also include all people who are dependent on the livestock and other economic activities related to the livestock production. The community is based on pastoralism and the culture influenced by the pastoralism practices. Generally, the people spend most of their working time and energy to look after their livestock¹⁹, but it may be complemented with other economic activities, such as trade, hunting and agriculture. Pastoralism also contributes with products to markets and national food security and economy.

In addition to ecological and economic definitions Ingold²⁰ has stressed a more ideological or social definition of pastoralism, based on ownership and the reproduction of livestock over time. In this definition the focus lies on the social and cultural systems that have been developed to maintain livestock for future generations and needs. Such definition puts weight on pastoralists' ability to develop and maintain social networks for the exchange and reciprocity between and within groups.²¹ By these networks animals can be borrowed for the rebuilding of herds lost to disease, droughts or theft.

We are inspired by the definition considering the social context. We are interested in communication and platforms for decision -making around water resources. We are thus using the definition that allows us to look into the social mechanisms for livestock herding and we focus on the management of water and forage. We will argue that kinship and social

¹⁴ Oxfam, 2008

¹⁵ Nunow, 2000

¹⁶ Food and Agriculture Organization of the United Nations, 2005.

¹⁷ Nunow, 2000

¹⁸ Nunow, 2000

¹⁹ Nunow 2000

²⁰ Ingold, 1980

²¹ Ingold, 1980

relationships between people is the basis for surviving in an unpredictable and constraining environment and these notions are also reflected in their settlements and everyday lives as nomadic pastoralists. The pastoralists we have been in touch with live in a dry land that makes them dependent on key resource areas. We will now introduce the dry land pastoralists with whom we have conducted our study.

1.3 The study area

We have carried out our study with the help of a certain pastoral group living in the Northern Kenya, the *Samburu*. The Samburu live in an arid environment that we will discuss in the next section, but first we describe the people in the area.

1.3.1 People in the Samburu Highlands

The Samburu District is located in the Northern Kenya (Figure 1). The Samburu people are a Nilotic tribe originating from Sudan and have settled north of Mount Kenya and south of Lake Turkana in the Rift Valley²². They are nomadic pastoralists and maa-speakers, forming part of more than one million speakers of the maa dialect descending from the Eastern Nilotic languages.²³ Some Samburu are descendent from remnants of Laikipiak Maasai, (a Maasai section which was destroyed in the late 19th century), while others are from Rendille, Turkana and Borana tribes. The Samburu are related to the Maasai, a tribe that is also nomadic pastoralists and with similarities in culture and traditions.²⁴ The main difference between the two groups is considered to be geographical; the Samburu live in Northern Kenya while the Maasai migrated southwards and settled in the Rift Valley area. Both cultures are famous for practising pastoralism and their reliance on diets of milk, meat and blood.

²² Straight, 2005

²³ Fratkin, 1991

²⁴ Straight, 2005. Hollis, 1905.

The location of Samburu District in Kenya



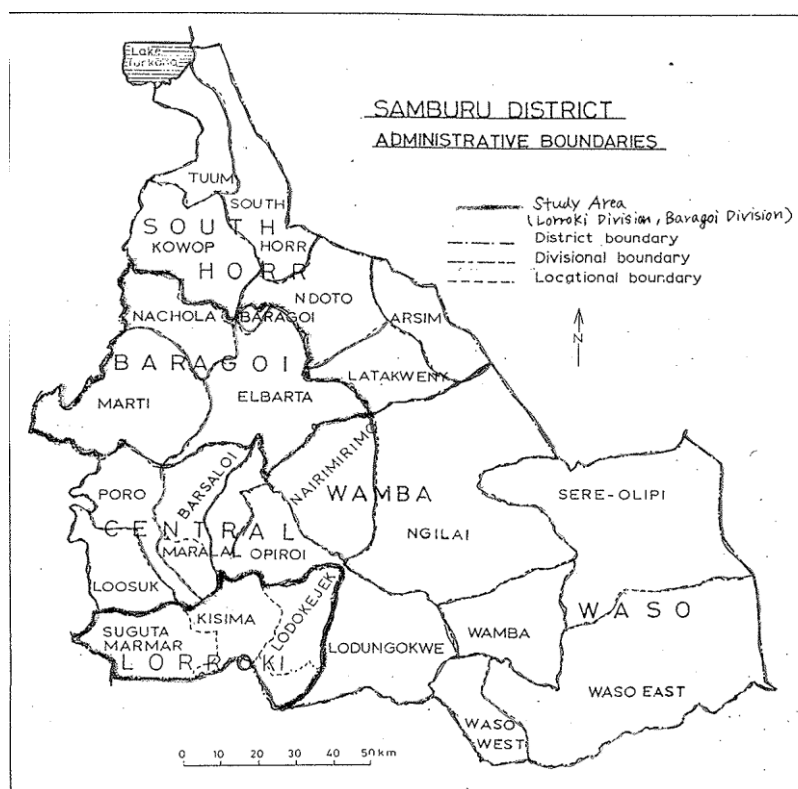
Figure 1 Samburu District (Red area) is located in Northern Kenya. Source: Republic of Kenya, Samburus District of Development Plan 1997-2001.

In the 21st century the Samburus live varied lives economically as well as culturally, and can be found holding teaching, office work and other jobs, but most people still keep and trade livestock²⁵. They herd cattle, goats and sheep in communal lands or group ranchers. In these

²⁵ Republic of Kenya 1997, Spencer 1996

lands the herders move freely in the wet seasons and they migrate several times a year during droughts in the search for pasture and water for their livestock.

The community in the Samburu society we were focusing on in this study lives in the Lorroki Division (Figure 2). They live in settlements known as *ankang*, a complex of *manyattas*, which are the traditional hand build huts. The houses are temporal since the people need to be mobile in order to follow water and pasture that we will describe later. The large ritual settlements, known as *Lorrora* may consist of thirty or more families. Polygamous marriages are practiced and a man may have multiple wives. One family can be composed of a man and his wives and each woman has her own house, which she builds out of local materials, such as sticks, mud and cow dung.



Source: Republic of Kenya, *Samburu District of Development Plan 1997-2001*, (Government Printer)

Figure 2 Lorroki Division is located in South West Samburu. Source: Republic of Kenya, *Samburus District of Development Plan 1997-2001*, (Government Printer).

In this community the Samburu have settled together in order to cooperate in security; to herd cattle together and protect it from raiders and to guard the village at night. The houses are

surrounded by thorn bush fences to protect the settlement from cattle raiders and wild animals. The common settlement is also a sharing mechanism and provides social security; people share resources with each other. Someone who has lost all cattle can get animals from others to rebuild his own herd. Basically everything in the household is shared with friends and relatives. Circumcision of boys and other ritual ceremonies are also easier to organise with the large settlements of Lorrora. Another reason for co-living is to facilitate the administration of the elders who gather on a regular basis. The houses are built in a circle with an open space in the centre where the parliament or *Naapo* (Figure 3) is located. In the Naapo the elders meet to discuss and decide upon different issues. The role of the elders as well as other community members is clearly defined.

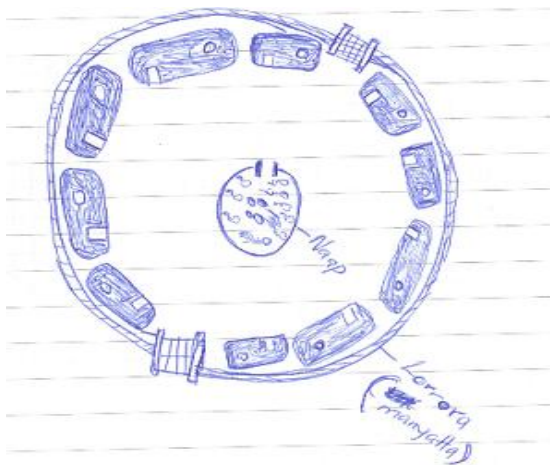


Figure 3 The traditional parliament, the Naapo, is placed in the centre of the ritual settlement, *ankang*. The *ankang* is the complex of *manyattas*, the traditional hand build huts.

Duties and rights of women and men, boys and girls are clearly delineated²⁶. Women are in charge of maintaining the portable house, milking cow, fetching water and gathering firewood while men are responsible for the livestock and may migrate in the search for water and pasture. Boys herd cattle and goats, learn to hunt and defend the cattle and girls fetch water and gather firewood and cook; they assist their mothers in the household. Both boys and girls go through an initiation into adulthood, which involves training in adult responsibilities and circumcision for boys and clitoridectomy for girls. The duties of community members differ but are commonly organised around the livestock herding since the reliance on it is the common basis for all the members.

With the description of the people in Samburu we want to illustrate that the community is organised around the management of water and land. The management is reflected in the settlements and in the social structure. This is due to that the whole community is dependent on a livelihood based on water and forage found during wet and dry seasons. We will stress that the key resources constitutes the basis for this pastoralist community. The understanding of the management of key resources will thus give us an insight into the management of water and land. Below we will broaden the description of the study area by providing an historical background.

1.3.2 History

Kenya came under British control after the Berlin Conference in 1885 where the European countries regulated trade and colonialism in Africa²⁷. The conference institutionalised European imperialism and resulted in the occupation of countries outside Europe in the search of raw materials and fertile lands.²⁸ During the colonial period Kenya was marked by the European control of the fertile lands, which was undertaken by a new legislation on land tenure. Ethnic divisions between people were enhanced resulting in that tribes were put into different parts of the country²⁹. The two related tribes the Samburu and the Maasai were formed as they appear today during the nineteenth century³⁰.

²⁶ Republic of Kenya 1997, Spencer 1996

²⁷ Blij & Muller, 2003

²⁸ Magnusson, 2004.

²⁹ Spencer, 1965.

³⁰ Ibid

The fertile lands in the Rift Valley where the Maasai settled were now exposed to the interest of foreign settlers who took control over the area by introducing land tenure policies that granted them access and right to the land. The colonial government and the European settlers were however not interested in the Samburu Highlands mainly because of its aridity and marginal soils³¹. The Lorroki Highland area in the Samburu District constitutes an exception however. Settlers tried to gain control over the highland area, but coincidences and strong opposition resulted in that it was never taken from the people³².

The colonial era affected the indigenous people's rights and access to land. The new policies were especially affecting the nomadic groups. The pastoral livelihood was considered as irrational and unsustainable and should for this reason be replaced by settled forms of agriculture.

During the colonial period settlement of farmers of European origins was encouraged and groups of indigenous origin were placed into reserves³³. In general, pastoralist practices and mobility was interpreted in a way that favoured marginalisation of them³⁴. Pastoralists were told to settle down and were squeezed into marginal areas³⁵, meaning that the colonialists could occupy the fertile lands. This facilitated control of pastoralists by the colonial government. Their land use was also marginalized based on perceptions of pastoralism resulting in environmental degradation and desertification³⁶ because of overgrazing, overstocking and poor soil management practices. Producers of international development literature have also held this view. Kenya achieved independence in 1963 but even after this the development research has for long time focused on livelihoods in dry land areas but from a technical top-down approach, not targeting the indigenous communities' aspirations and knowledge systems.

The perception of pastoralism as inefficient has its origin from the colonial era. The marginalisation of pastoralists cannot be separated from the colonial interest in fertile lands. Below we will provide a review of the scientific debate on dry land pastoralism and how the view on it has changed with new knowledge. We however want to stress that the scientific

³¹ Sortland, 2009.

³² Ibid

³³ Spencer, 1996

³⁴ Sullivan & Homewood, 2003

³⁵ Trafzer, 2000

³⁶ Sullivan & Homewood, 2003

research has been affected by the perception of pastoralism that was formed during the colonial era. But before the review of the dry land pastoralism debate, the environmental characteristics of Samburu District and arid environments will be outlined. This will clarify that the Samburu are living in a pastoral dry land.

1.3.3 Samburu District and the nature of arid environments

Samburu District has a landscape characterized by plains with undulating hills (Figure 4). The vegetation cover is thin, mainly constituted of grasses with small stands of deciduous trees and bushes. The climatic conditions differ between two broad areas: the arid and semi/arid lands (hereafter the ASALS) with temperatures around 30° C, and an annual rainfall of 500 mm concentrated to the rainy seasons of April and October³⁷. ASALS ecosystems are widespread in the world and extend over more than a third of Earth's total land area.³⁸ Around 14 % of the world's population live in ASALS and in Africa a tenth of the population is estimated to live in different types of arid lands or dry lands. These environments are characterised by low and irregular rainfall and reoccurring droughts³⁹. The irregular rainfall of Samburu District (Figure 12 and 13) illustrates that the region falls into the category of ASALS. Evaporation, e. g. the rainfall that falls from the atmosphere and then eventually returns back to the atmosphere, is two times higher than the rainfall making water sources to be scarce. In Kenya 80% of the area can be classified as ASALS⁴⁰, which is illustrated in Table 1 where Samburu District falls into the category of 85-100 %.

³⁷ Langat, 1994

³⁸ Ahmad & Kansas, 1987

³⁹ Langat, 1994

⁴⁰ European Union, 2008



Figure 4 The typical landscape in Samburu is characterized by low and thin vegetation cover, few mountains and vast plains. Photo: taken between Suguta Marmar and Maralal, Samburu, 2009.

The figures and the table affirm that a majority of the environment in Samburu District is characterised as ASALS, and its constraints imply challenges for the people living in the area. The Samburu pastoralists have however developed survival strategies that are the focus of our paper.

Table 1. The percentage of land mass covered by arid or semi arid lands (ASALS) are relatively extended in the districts of Kenya. A considerable landmass of Samburu District is classified as ASALS Source: European Union. Kenya Natural Disaster Profile, 2008.

Category ASAL	District	Total ASAL %
100 % ASAL	Turkana, Moyale, Marsabit, Isiolo, Wajir, Mandera, Garissa, Wara	62
85-100 % ASAL	Kitui, Makueni, Tana river, Talta Tavel, Samburu	25
50-85 % ASAL	Machakos, Mbere, Tharaka, West Laikipa, Pokot, Kwale, Kilifi, Baringo, North Meru	8
30-50 % ASAL	Lamu, Navok, Malindi, Keiyo, Marakwet	3
10-20 % ASAL	Nyeri, Rachananyo, Saba Kuria, Thika, Koibatec	20

1.3.4 Livelihoods in dry lands

In dry lands pastoralism is one of the key production systems, being more suitable to the specific environment than farming. The highly variable climate and the unpredictable rainfall pattern make it hard to rely on agriculture. During wet seasons (Figure 5) vegetation resources are abundant due to higher amounts of water but during dry seasons or droughts, there is hardly any water available (Figure 6). It is the most efficient way of converting forage to milk and meat. Farming depends on regular rainfall for crops and livestock in fenced areas will have to shift to new areas when the forage is exhausted. The irregular rainfall also complicates the production of fodder for animals. Pastoralists have developed certain strategies for finding regular water supply and pasture in an environment where water and

vegetation sources are scarce, as is the case in ASALS. What is characterizing the Samburu pastoralists' livestock herding and pastoralism in arid environments in general is the mobility and flexibility as an adaptation to the environmental constraints.



Figure 5 During the wet season the vegetation resources are abundant due to rainfall and can the climate can be temporally suitable for agriculture. Photo: Taken in Samburu District, 2009.

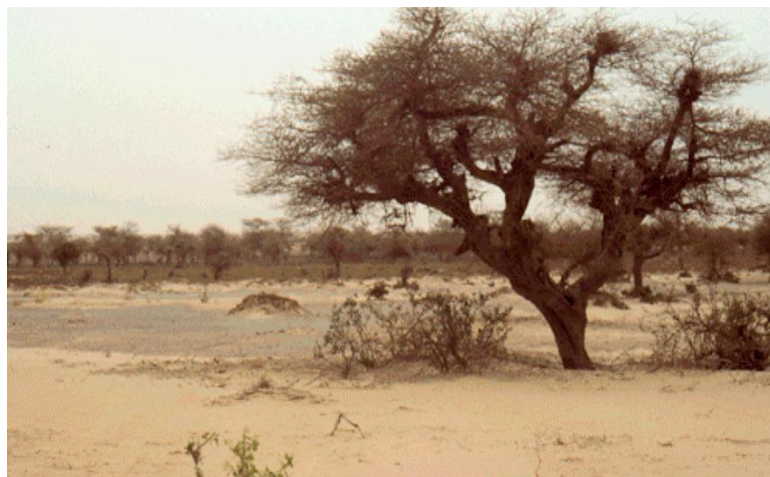


Figure 6 During dry periods and the recurrent droughts with no rains agriculture cannot be practiced. Photo: Taken in Samburu District, 1996.

CHAPTER TWO: DRY LANDS PASTORALISM

2.1 Equilibrium, carrying capacity and non-equilibrium

In an equilibrium landscape rainfall patterns are predictable and there is a determined number of livestock that can be sustained through time by vegetation and water resources⁴¹ (Figure 7). The carrying capacity theory builds on the view stressing that ecosystems have a stable state of equilibrium⁴². A non-equilibrium landscape is characterized by variability in rainfall dynamics with recurrent droughts.⁴³ This environment enforces herders to move with their livestock on a seasonal or inter-annual basis. Table 2 provides a clarification of the differences between the different environments. Up to recently pastoral dry lands were considered to be equilibrated and pastoralists have been considered to overgraze the pasture with their livestock, referred to as the overgrazing theory. Recent research has nevertheless showed that the pastoral dry land should be classified as non-equilibrium environments⁴⁴, and the variability and fluctuation in rainfall may affect the vegetation more than the number of animals and grazing patterns⁴⁵. The non-equilibrium environment makes it impossible for pastoralists to create herds big enough to overgraze the dry land⁴⁶. Illius and O'Connor⁴⁷ however stress that not everything in the system is non-equilibrate. There are certain areas in these landscapes that are predictable and important for pastoralists. They contain water and pasture crucial during dry seasons that can complement the resources found in the surrounding landscape. Too many animals can exhaust these resources confirming that the carrying capacity applies in the non-equilibrium pastoral landscape with rainfall variability. The water and pasture found during dry seasons are the basis of survival for pastoralists and must be considered as pastoral key resources areas⁴⁸.

⁴¹ Ingold, 1980

⁴² Illius and O'Connor, 1999

⁴³ Scoones, 1994

⁴⁴ Ellis & Swift 1988; Print, 1997

⁴⁵ Behnke, 1993; Ellis & Swift 1988

⁴⁶ Illius and O'Connor, 1999

⁴⁷ Ibid

⁴⁸ Scoones 1995; Illius and O'Connor 1999, 2000

Table 2. A comparison between equilibrium and non-equilibrium environments elucidates the characteristics of the latter. Source: Oba et. al., 2000 in Sullivan, S. & Homewood, K., 2003.

Equilibrium	Non-equilibrium
<p>Ecology:</p> <ul style="list-style-type: none"> - Climate stability - Stable interannual primary productivity - Livestock population strongly coupled with vegetation (density dependent) - Change stocking density creates predictable changes in plant assemblages <p>Policy and economics:</p> <ul style="list-style-type: none"> - Potential carrying capacity can be predicted - Stocking density can be regulated according to carrying capacity - Land and resources under private/freehold tenure <p>Goals:</p> <ul style="list-style-type: none"> - Strongly commercial/financial; benefits/profit vested in cash and capital 	<p>Ecology:</p> <ul style="list-style-type: none"> - Unpredictable climatic variability - Unpredictable variable primary productivity (tightly linked to rainfall) - Livestock track unpredictable forage production <p>Policy and economics:</p> <ul style="list-style-type: none"> - Calculations of carrying capacity not useful - Opportunistic grazing practises employing mobility are more appropriate - Land and resources held and managed as common property, and/or under communal tenure regimes in southern African reservations <p>Goals:</p> <ul style="list-style-type: none"> - Subsistence: reproduction of herd: profit vested in social relationships (although nb. - - - Prevention of cash/capital accumulation and of participation with emerging economies in southern Africa because of long history of marginalisation under apartheid (cf. Bollig, 1998a and b)

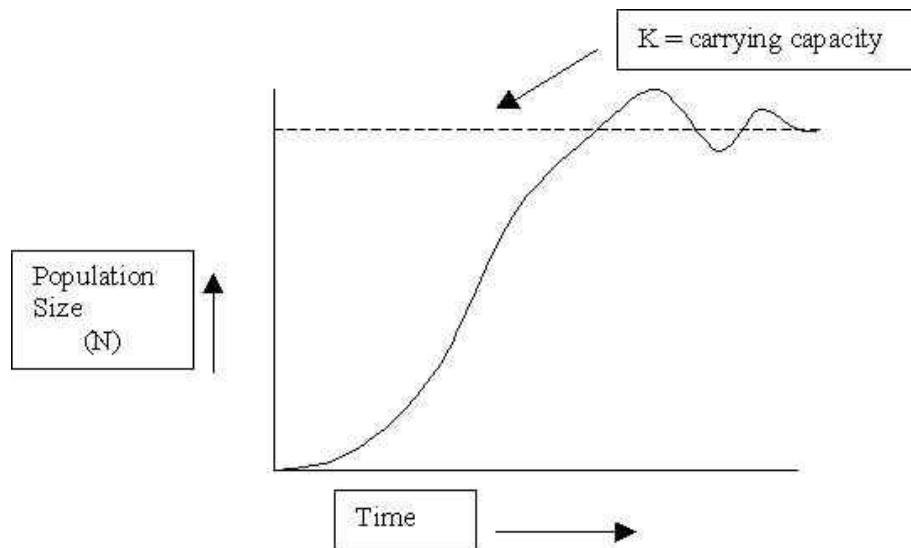


Figure 7 An equilibrate environment has a carrying capacity level which makes the ecosystem to be disturbed when it is reached. Source: zebu.uoregon.edu/2004/es399/lec10.html Available 2010-09-06

The understanding of the pastoral livelihood and its land and water management has deepened with the appropriate view on the pastoral dry land. In research on pastoral dry lands it is important to understand that in the pastoral landscape two kinds of rooms can be identified; the non-equilibrium environment and its places that have certain equilibrate characteristics (Figure 8). As an adaptive strategy, the pastoralists shift between the resources found in the different landscapes. The water and pasture found in the equilibrium landscape during dry seasons are the key resources, a concept we will introduce next.



Figure 8 Buffaloes surrounding a key resource that is an equilibrated room, within the dry land, or non-equilibrium landscape.

2.2. Pastoral key resources

Dry land pastoralism is dependent on key resource areas and to understand the practice associated with these places is crucial for understanding the fundamental principles for pastoral land and water management. Key resources are areas that contain persistent water sources and associated pasture mainly used during dry seasons. They offer a certain amount of predictability in a landscape characterized by extreme variability. They can include areas with moisture soil retained by drainage lines, dambos, sumps and vegetation and trees favored by livestock and people.⁴⁹ During prolonged droughts when nothing else is available, more persistent key resource areas constitute what can be considered refugee areas.

We suggest that research on pastoralism aiming towards a better understanding of environmental monitoring and communication, and the management of water resources could profit from an approach based on the notion of pastoral key resources. We thus use the key resources as a theoretical platform for understanding pastoral management of water resources. In this study we want to gain such understanding by a study of the pastoral key resources in Samburu Highlands, Kenya. In the next section we will discuss how the research was undertaken.

⁴⁹ Illius and O'Connor, 1999

CHAPTER THREE: RESEARCH DESIGN

3.1 Aim of the study

Departing from the discussion above concerning pastoral key resources and their significance for pastoralism in an arid environment our idea is to use them as a basis for understanding the pastoral water and land management. We did this by identifying and investigating pastoral key resources used by pastoral groups in the Samburu District, Kenya. Our study of the pastoral management of key resources was done by a research approach incorporating three steps:

1) Identify and map features of key resources. Through a survey in the study area we identified features in the landscape which can be taken as indications of key resources. This was done together with the local community by a participatory research approach. Through that strategy we were able to note the location of a series of key resources on a map over the research area. The survey map was the point of departure for our further discussions with our informants concerning the key resources. Through the participatory approach we were able to gain insights into the everyday management of key resources and subsequently our second aim was as follows;

2) Understand the pastoral management of the key resources. As an adaptation to an unpredictable natural environment, pastoral groups have developed viable strategies to find and monitor key resources. We wanted to better understand the management of the resources by participant observation and discussions. Since the availability of key resources is the single largest constraint to pastoral land-use in dry environments we also aimed at:

3) Understand current changes affecting the management of key resources; drought, privatisation and conflicts. Drought and rainfall affect the availability of water and pasture but changes in land policies; whether land is public, commune or private determines an individual herder's access to land resources. Conflicts between different pastoral groups can also change accessibility to key resources; one group's use of a resource can exclude another and conflicts can leave areas with key resources abandoned due to fear of conflicting groups.

The three objectives were applied within the framework of the Integrated Water Resource Management (IWRM) principles. IWRM is a relatively new approach that arose within the international community of water management⁵⁰. As described earlier, it is based on the on the five Dublin principles presented in the World Summit in Rio de Janeiro 1992². The concept has been developing since the early 1990s. In 1996 the World Bank, the United Nations Development Program (UNDP) and the Swedish International Development Agency (SIDA) created the Global Water Partnership (GWP) “in order to foster integrated water resource management (IWRM)”³. In the World Summit on Sustainable Development (WSSD) arranged by United Nations (UN) in 2002, countries were urged to “develop integrated water resource management and water efficiency plans...with support to developing countries”⁵¹. The concept emphasizes on maximising economic and social welfare and at the same time foster sustainable use of the natural environment⁵². The underlying essence is that a water source has many different users who are dependent on each other. Irrigation, industrial, household purposes, fisheries and water for livestock interfere when using the same water source and users thus have to cooperate at an integrated level. Initiatives and policies built on IWRM principles emphasize on the integration, the communication and cooperation, between different stakeholders. IWRM has developed as a reaction to “traditional, fragmented sectoral approach to water resources and management that has led to poor services and unsustainable resource use”⁵³. It aims at being a “cross-sectoral policy approach”⁵⁴ and stresses five key concepts commented in the earlier section. These are the multiple uses of water (it is a resource for drinking, washing as well as for livelihoods, e.g. pastoralism), holistic management (considering both supply and demand), multiple perspectives (economic, social and environmental), participatory approach (local communities participate in decision making

⁵⁰ Jonch-Clausen, 2004.

⁵¹ Jonch-Clausen, p. 6, 2004.

⁵² Global Water Partnership^b, 2010

⁵³ Global Water Partnership^b, 2010.

⁵⁴ Global Water Partnership^b, 2010.

about their resources), women's involvement (recognizing the important role of women in managing water).

Development institutions have recognized that gaining a better understanding of the livelihoods in dry land areas creates challenges for scientific research for development.⁵⁵ The research approaches have been single-disciplinary, e.g. either within anthropology, social science or natural science with clear boundaries and with a single scale focus. As a reaction new approaches within natural resource management (NRM) have developed, intended to deal with scale and complexity issues. Eco-agriculture, integrated rural development, integrated conservation and development all aim at applying a more holistic approach in NRM research.

IWRM inspired research can facilitate a more participative research around water resources. It allows the community members to participate in order to define and describe their water management systems⁵⁶. The gains are thus a more community-based research leading to initiatives considered to be sustainable on the long-term.

In this research we focus on the pastoralism as a livelihood highly dependent on water that is one of the key concepts introduced above of the IWRM and the local community is also the point of departure for our fieldwork. One of the principal components in IWRM is to integrate land with water⁵⁷ in order to understand its management and to hold a holistic view on water resources as situated in a landscape, which is also our aim considering the pastoral use of water and land. We suggest that IWRM principles would be appropriate as a part of a new research approach on pastoralism in dry lands. Before discussing our findings and conclusions and how they are linked to the IWRM research approach we will clarify some of the concepts we are using.

One of the principal components in IWRM is to integrate land with water⁵⁸ in order to understand its management and to hold a holistic view on water resources as situated in a

⁵⁵ Thomas et. al., 2003.

⁵⁶ IRC International Water and Sanitation Centre, 2004

⁵⁷ USAID, 2006

⁵⁸ USAID, 2006

landscape, which is also our aim considering the pastoral use of water and land. We suggest that IWRM principles would be appropriate as a part of a new research approach on pastoralism in dry lands and describe how they relate to our study aim and objectives in Figure 9. Before discussing our findings and conclusions and how they are linked to the IWRM research approach we will clarify some of the concepts we are using.

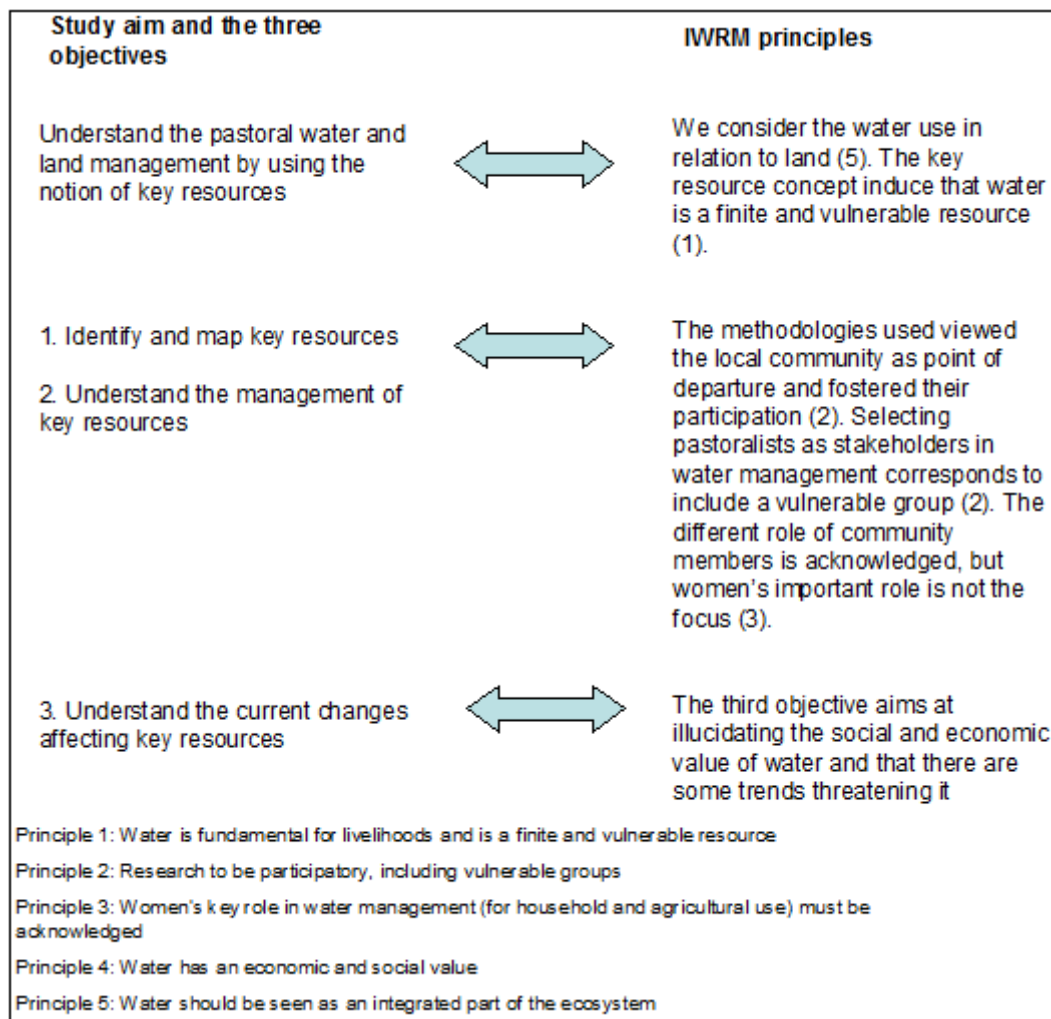


Figure 9 *The study is undertaken through an Integrated Water Resource Management (IWRM) approach.*

3.2 Fieldwork and Methods

We conducted fieldwork in Lorroki Division, located in Samburu District, Northern Kenya. The time period was three months, from January to April 2010. We were based at Suguta Marmar, a town 11km from Lorrogate, the pastoral village. We travelled at least four days per week to Logorrate.

The methodologies we used in our fieldwork consist mainly of participatory observation, semi-structured and open-ended interviews. At the first day in our fieldwork we held a community meeting in Logorrate village, so that we could be able to present ourselves, our fieldwork and the methods we would be using. For us it was very necessary to discuss with people what we were doing in the area, which we were. We also tried to clarify to them our fieldwork as researchers. We explained clear to the community in Logorrate that our work was not a development project and that they should not expect that from us. We discussed with them that we needed to spend time together with them and that our fieldwork was based on learning from them. We believe that the meeting we held were very usefully in the sense the community understood our fieldwork and us. By introducing ourselves we felt very welcome and the community was very cooperative to help us in all ways. We had excellent support from the community in Logorrate village.

Throughout the study we wanted to become as close to the informants as possible and be part of their daily lives in order to understand it and get a real insight into the pastoral livelihood in connection to our study aim, objectives and IWRM approach. We connected the participant observations and the interviews to our themes (our objectives) and took notes during the interviews or shortly after. Our aim was to learn as much as possible in relation to our study aim and to do it considering an IWRM perspective.

3.2.1 Participant Observation

The participatory observation regarding the water points consisted by that we spent time with people when they took their animals for drinking water in morning hours. We also walked with them and their cattle when they let them graze on located pasture. In the evening hours we observed the meetings, when the elders came together to get the daily news, *lomon*, from the *morans*, the young men or warriors. The meetings are held every evening and concern the major issues that currently have come up during the day. They discuss grazing areas and water points. We used to sit with the elders in the *Naapo*, the meeting point for the elders in

the evening, a sort of parliament, were they get together around fire and discuss and take decisions for the community.

3.2.2 Interviews

Our interviews were focused group discussions. We conducted most of the interviews with owners of cattle (men), the senders (morans) and the elders (arranged during daytime outside the Naapo). Our questions were based on our previous understanding of dry lands pastoralism, yet we aimed at being open and learn from the informants as if we did not have so much knowledge. We wanted them to give us their perspective and add it to what we had learnt from the literature studies. Our primary themes were water points and pasture and how the natural resources are located and managed. Many of the discussions regarded the current changes introduced by the informants themselves. Due to our previous understanding of drought, conflict and privatisation in relation to the pastoral livelihood, we could participate in the discussions to a certain extent. In order for the word to be spread during the interviews and consider different thoughts of the participants we used the chickpea, or stick, technique where the holder of it is the one allowed to talk. It was limiting the discussions in one way since it became more of a session where individuals spoke their mind one after another. It however prevented anyone to dominate the meeting and we aimed at letting everyone who wanted to speak.

3.2.3 Semi-structured interview

Semi-structured interview is the most important form of interviewing in case study research. (Walsham (1995). It is flexible to the knowledge, which is gained along the research. The interviews will guide the conversations rather than structured queries. In other words, it will follow a consistent line of inquiry. (Method 2007,6(4) 80) We found the kind of interviews appropriate since most of them were conducted in the field, either by walking through the landscape when many questions arose about it or in a more arranged way. Many discussions were spontaneous and could arise in a walk, while resting under a tree or over a dinner. Our aim was to gain as much insight as possible by spending time with the people of our interest in their daily life. When we had more specific questions about selected issues such as the location of water points we arranged meeting with the elders.

3.2.4 Open-ended interview

Another kind of useful method was the open –ended interviews. They allowed the interviews to be more fluent than fixed. We introduced a theme, e.g. the conflict and the reason behind it. The informants were asked to explain the conflict events as well as their opinions about it. It could also start at the other end that they introduced their perspective on a certain occurrence, e. g. if there was any privatisation in the area which had negative effects on the community and their opinions constituted the basis for further questions.

CHAPTER FOUR: DEFINITIONS OF TERMS

4.1 Traditional

With the term traditional we refer to locally based knowledge systems and social structures the people acknowledge as traditional. By acknowledging things to be traditional they are granted authenticity and can be used for legitimise power. We want to stress that the social structure decides who has power in the community and access to key resources such as water. The hierarchy is deeply rooted in the society and is traditional. Thus, when we use the term traditional we are referring to the management resulting from the traditional roles distributed in the community.

4.2 Conflict

As we will discuss below, a majority of the community members expressed that water scarcity, especially during drought, result in conflicts concerning the access to and management of key resources. The conflicts are being dealt with by using traditional conflict resolution mechanisms. We are using their definition of conflict as arising when the key resources are scarce and there is competition over them. As we will discuss below conflicts over water, pasture and land has led to theft, and to fights resulting in injuries etc. within and between families and communities, and between humans and the wildlife.

4.3 Privatization

By privatisation we mean territory that is owned by an individual, the land is fenced and the owner does not let anyone to use that land without permission. This means that people others than the owner are excluded from that area. We also refer to individually owned key resources. During wet seasons everyone can be allowed to use the resource, but during dry periods the owner can exclude others.

4.4 Selection of cases

Our study is based on mapped features in the landscape which can be taken as indicators of key resources. An important part of the survey strategy was discussions with local informants and participant observations in the field. We approached them by asking them how they survive in the dry lands during dry periods. We then concluded that the features they look for in the landscape indicative for persistent water sources and pastures are key resources. This

elucidated water as a fundamental resource as we presumed from the IWRM principles. It is also finite, since its availability is limited during dry seasons, thereby the key resources concept.

By our previously understanding of the clearly differentiated roles of men and women, boys and girls in the management of water and pasture, we targeted the males for the open-ended and semi structured interviews. We were aware of the important role of the women in the household to sustain the pastoral livelihood, but our main interest was in the management of key resources. We understand that men (young men, *morans*, and owners of cattle) are responsible for finding water for the livestock and take off during droughts in the search for key resources. Most cattle owners are men and they also have the power to affect decisions around water management, discussed by the elders. That is why we were interested mainly in the men as informants. By using the participatory mapping approach we created an over view map of the area including indicators of key resources which was used as a basis for discussions on management.

The second objective which addresses the management of the key resources was fulfilled by further group discussions, which the interviews resulted in and participant observation. We aimed at carrying out the interviews by walking together in the landscape letting the informants show what they consider as key resources. Questions asked focused on the informant's notions of how water and pasture are being find, what management principles that are applied and their relation with the social structures.

The third aim addresses the availability and the management of key resources in relation to the current situation; a long lasting drought and trends of privatisation of natural resources, and also conflicts arising because of scarcity. We undertook interviews addressing these questions. We had presumptions of what the current changes might be, and these were confirmed by the participants and through observations in the field. Our pre-understanding was that water has a high social and economic value and that the current changes are threatening its status to different various extents.

In the next section we present our most important findings followed by a discussion on how it relates to our study aims, objectives and approach. We thereby conclude how the pastoral water and land management is related to the notion of key resources and that it must be seen from an IWRM perspective.

CHAPTER FIVE: FINDINGS

Permanent water key resources in Samburu during dry season or drought are man-made wells and a swamp. The man-made water points are used at the beginning of a dry season. They are considered as key resources during that stage. The Samburu migrate searching for key resources that they and their livelihoods are dependent on. We found that this is the most important element of their survival, the continuous migration and continuously looking for water resources.

1) Identify and map features of key resources:

Our participatory observations, interviews and discussions on water and pasture used during dry seasons, the key resources, aimed as a first step at understanding what features the pastoralists look for in the landscape in order to find water. We wanted to understand how water is found during dry seasons and droughts. The features in the landscape indicating that water can be found are:

- Acacia and baobab trees
- Caves
- Large stones
- Drainage lines
- Thick grass

2) Understand the pastoral management of key resources

The Samburu pastoralists settle down in closure to key resources (Figure 10). The settlement is arranged in a way that facilitates the management of key resources. Meetings are hold in the Naapo (Figure 10) where elders discuss and make decisions. The management is determined by the social structure, which we identified in the field (Figure 11).

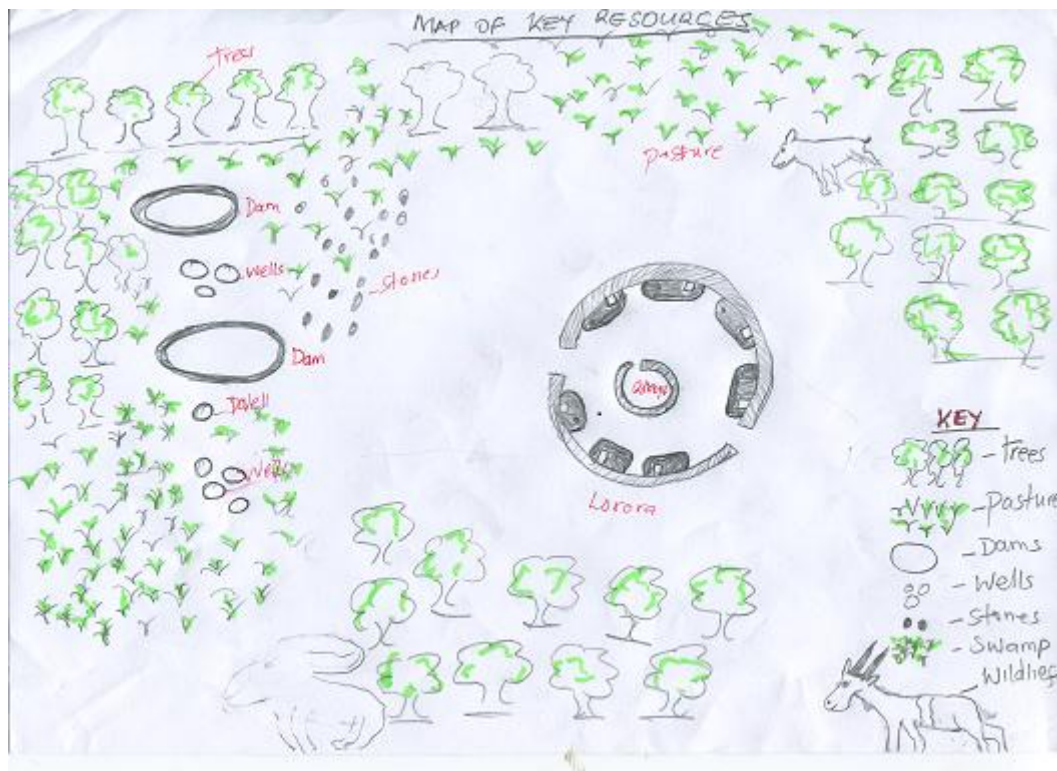


Figure 10 The community settles down close to key resources

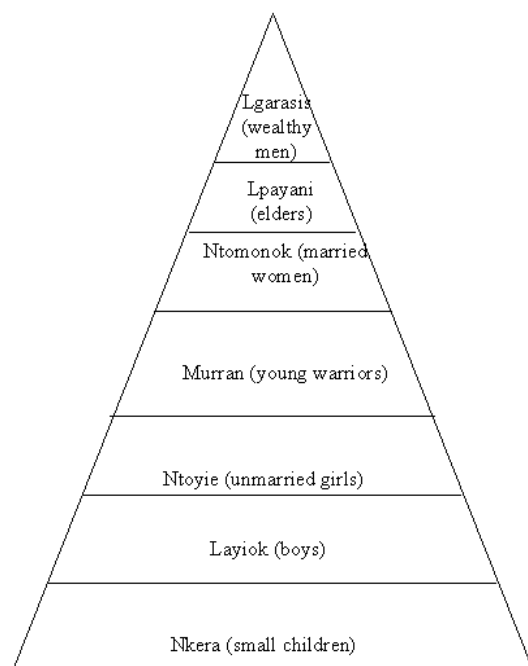


Figure 11 The general hierarchy of the community clearly defines roles in the key resources management

To understand Samburu key resource management one has to understand the hierarchy in this community, as represented in Figure 11. Based on hierarchy of the Samburu community, men have more power in decision- making, specially the elders. The wealthier a person has (the more livestock), the more power and more decision- making on the management of the key resources he posses.

3) Understanding the current changes affecting the key resources.

The findings on current changes affecting the key resources were based on our previous knowledge of the study area and of threats to the pastoral livelihood in general. From our literature studies we had concluded that the three aspects affecting the key resources are prolonged droughts, privatization and conflicts. It was confirmed at an early stage in discussion with our informants that these aspects are preoccupying the village the most.

The main challenges related to water is inadequate supply and resultant conflicts. The conflicts arise between individual, families and groups within the same community as well as between different communities. They result in poor livelihood as well as in corporal injuries and death among animals and human beings. The problematic situation of permanent shortage of water is worsened by recurrent droughts with devastating effects on both animals and people and all these limit access to basic needs as water, education and infrastructure development in Samburu district.

The close relationship between this key resource and the survival of the communities means that the pastoralists will usually employ any means available to them, including conflicts, to seek or claim control of the resources. The conflict revolves around three important aspects; access, management and privatizations, competing for the use of key resources mainly water and pasture.

Conflicts erupt around water sources and the elders are highest in the hierarchy and deal with the conflicts within the community and between communities the government. The elders are the most powerful in the conflict resolution process.

The most serious threat related to water in this area is drought. The two permanent water sources are not reliable, and during drought periods people and animals have to trek long distances to reach the swamp which does not even have enough water. Finding water is time consuming and force people to migrate during droughts.

Samburu pastoralists claim that the main sources of water are no longer accessible since the land has been privatized and they are strictly forbidden to enter. During the colonial era there were several water points in the area, which were used by the settlers, and pastoralists were displaced and faced hardships in finding safe water points outside the private land. With the new privatization, the new landowners captured the water and fenced it. The community members fear that more points will become inaccessible because of privatization.

Drought and few water points bring water scarcity, causing conflicts within and between communities, that are devastating for the community preventing their development and make them vulnerable and lead to massive migrations when Samburu lose resources and their lives are threatened.

The distribution of rainfall is more important than its quantity since it determines pasture growth. The Samburu pastoralists tend to follow a general pattern movement during droughts. They move into areas that are less affected, either within the areas or outside the district which sometimes result in conflict if they cannot reach agreements with other local pastoral communities. Prolonged droughts have direct negative impacts in water resources, with absence of pasture and massive animal death, bringing serious challenges to the Samburu economy since the livestock is the sole source of livelihood.

Samburu is under the arid and semi/arid classification with high temperatures about 30 degrees C an average, low rainfall and concentrated in two rainy seasons in April and October, receives between about 500 of rainfalls annually which follows a fairly erratic pattern varying significantly both in time and space and both short and long rains exist (Figure 12 and 13). This means that Samburu pastoralists barely meet basic water requirements. Consequently, they suffer from livelihood losses from conflicts and lack of water.

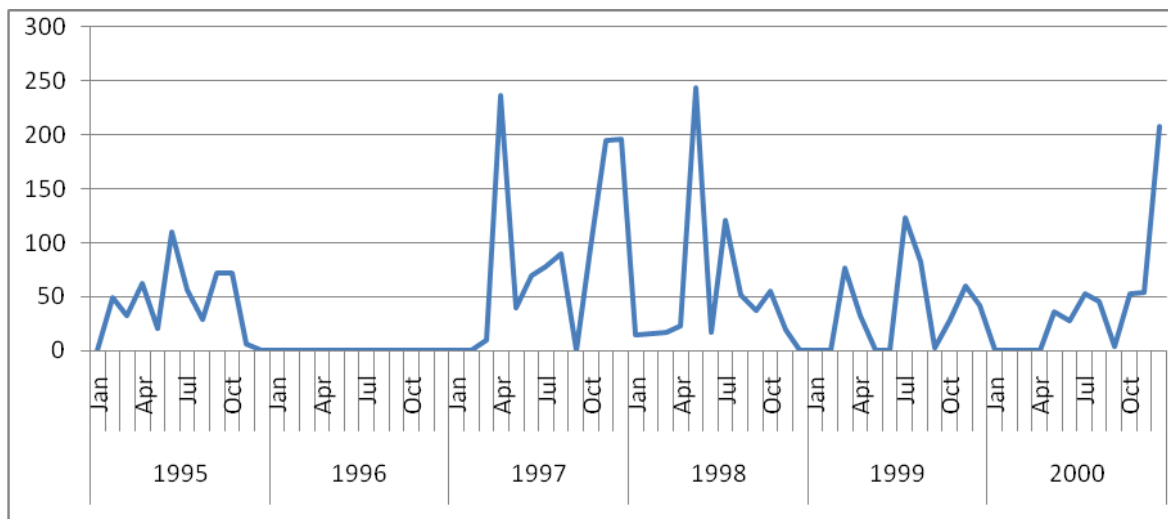


Figure 12 Monthly rainfall mm/month and year between 1995 and 2000 in Samburu District. Source: Samburu District Meteorological Office, 2006

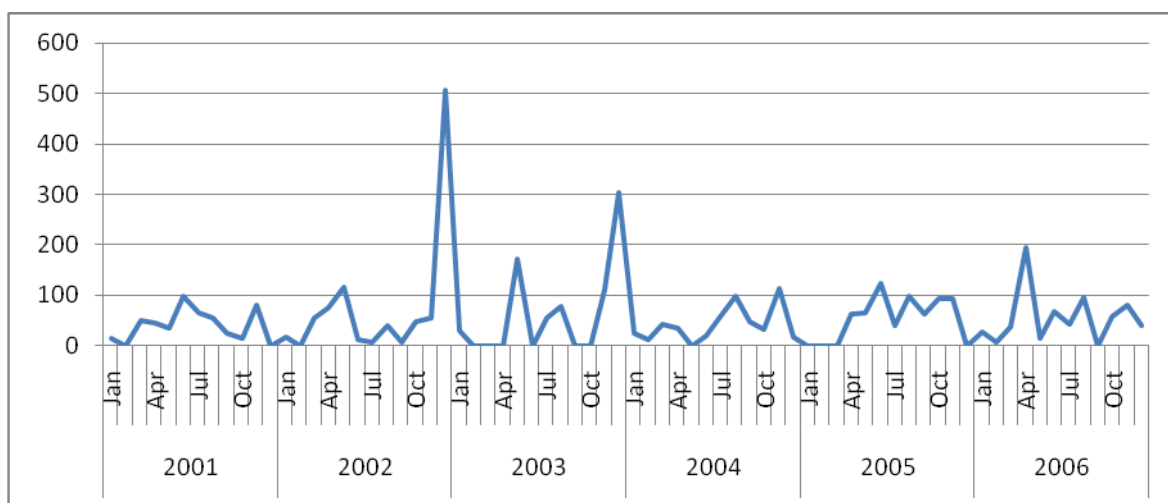


Figure 13 Monthly rainfall mm/month and year between 2001 and 2006 in Samburu District. Source: Samburu District Meteorological Office, 2006

CHAPTER SIX: GENERAL DISCUSSION

We have stressed that for fulfilling our aim of understanding pastoral water and land management it is useful to apply the notion of key resources as the theoretical platform. As IWRM MSc students, we also depart from the four IWRM principles¹¹ to understand the pastoral value of water and its integrated management with other natural resources in the ecosystem⁵⁹. First we discuss the importance of water for the pastoral livelihood and how our previous understanding of the concept of key resources was affirmed in the field. In the following section we will discuss our three objectives of identifying indicators of key resources, the pastoral management of them and finally what the current changes are affecting them.

6.1 The pastoral livelihood and its dependence on water

Before coming to the field we knew that most people derived their livelihood from pastoralism. In the arid- and semi-arid lands in Northern Kenya it is well known that the majority of the inhabitants survive on livestock keeping⁶⁰. As we have presented earlier this livelihood is based on animal welfare and highly dependent on the access to water, in relation to pasture⁶¹. Through the observation in field and by living in the village we concluded that the whole community was arranged around the welfare of the cattle. The men as owners of cattle were responsible for searching for water and pasture in collaboration with young men, morans. The Samburu landscape never lacks a herder with his livestock, letting them to graze or drink water. They are also seen migrating in the search for water. In the village where we spent most of our time, the meetings were held on a daily basis on how to organise the

⁵⁹ Global Water Partnership A

watering and foddering of animals. The women were in the houses taking care of the children and the household. They however constitute an important role in the pastoral livelihood.

It could be confirmed in an early stage of the field study that for this pastoral community water is a fundamental source for living. The IWRM principle (as emerged from the Dublin principles⁶²) coherent with this fact was thus usable as an approach in the field, in order to have an idea of the importance of water. The water as a natural resource is also vulnerable and limited, which we will discuss more in the current changes section. The well organised management of waterprooofs that it is a vulnerable resource that requires careful planning in order to have access to it.

6.2 The concept of key resources

From the discussion above concerning key resources our previous understanding of key resources is that they are the water and pasture used during droughts or dry seasons, when no other resources are available. ⁶³ We imagined them to constitute rescue areas in the dry land for livestock and humans.

The Samburu pastoralists live in a landscape characterised by irregular and unpredictable rainfall and recurrent droughts. They have adapted to the landscape by finding and using localised water and fodder resources, with higher predictability. For this reason these resources can be characterised as key resources. These key resources are water and pasture crucial during dry periods and droughts for the survival of cattle and humans.

Pasture is more abundant than water and the latter is seen as the most important resources. When water is located it must however be related to pasture, so that livestock can graze and have access to water.

In the first days in the field we however got introduced to water points, which fell out of our fixed perception of what key resources are.

⁶³ Scoones, 1995

In the area we found out that there are several persistent water resources, which have been modified by humans. The modifications consist of hand dug wells and dams for increasing outtake but also improving water storage, by concentrating water which would otherwise run off. Nilson (1988) confirms that small-scale dams can secure pastoral water during prolonged dry season, since the dams can harvest surface flows. These water sources thus play a crucial role for the livestock herding during the initial phase of dry season. Wells and open pond catchments has for long been a part of the dry land pastoralism⁶⁴. However most of the water sources are not sufficient to provide water throughout the whole dry season or a severe drought and in such cases the local pastoralists migrate to distant areas to find water and pasture.

There are two dams (Figure 14) and several wells located approximately 6 km from the Lorrora village. Among the informants these are considered as the first and most important water points and were the first ones we got introduced to. The dams have been constructed on the initiative of a non-governmental organisation (NGO) with machines and built with a wall, which blocks and keeps the water. The dams are commonly owned and managed and they can hold large amount of rainwater, but they hold less water usually for 5-6 months of the year. Livestock, dogs, humans are using the dams and also wild animals drink from the dam. The wells are constructed holes 2-5 meters wide and can be up to two metres deep. An estimate provided by the local community indicates that the wells are able to serve water to 2000-3000 livestock per day. The individual that dug it well owns a handmade.

The water is relatively clean and might have the best quality in the area. Most of the wells contain lesser water during 5-6 months of the year.

⁶⁴ Nilson, 1988



Figure 14 One of the dams in Lorrora village constituting a key resource during the initial phase of a dry period and a drought

The dams and the wells have been located on places where the water flow was assessed to be more abundant by looking at specific features in the geomorphology and in the vegetation cover. Slopes and streams leading runoff water to one point were typical indications of favourable conditions for water points. In addition the ground is wet; the grass is thick and green throughout the year and provides high quality pasture for the livestock. During the rainy season the dam and well area is left in order to allow the water and pasture to recharge until next dry season. During the rains water accumulates in depressions and pot-holes on the plains. These are transient water resources and used for watering the livestock until the next dry season.

The only permanent water resource is the swamp located 11 km from the village and it serves several purposes during dry periods. Cattle herders come here to water livestock. The swamp contains an approximately one square kilometre large area with salt licks and salty water. The salty water is not recommendable for human consumption, but favoured of the livestock. The swamp is surrounded by pasture and animals are always seen taking water there. The swamp is the area's most persistent and predictable water source for the livestock during the initial

phase of a dry period and contains water after the dams and the wells are exhausted. The inhabitants and their cattle are however many and occasionally the water in the swamp is not sufficient. Therefore the herders abandon the area with their livestock during periods of a few months up to years depending on how harsh the drought is. When we arrived to the area there had been a prolonged drought of two years and many of the informants had been away over the whole time period in order to find water for their cattle. The drought had also resulted in livestock deaths.

In summary, the dams and the wells are considered to be key water resources. They are mainly used during the initial phase of the dry season. After the initial phase of the drought there is little water to be found in the wells and the dams and in this phase they are used in combination with the swamp, which can be considered a permanent water source. Occasionally these water sources are not able to provide enough with water and during such periods the herders migrate with their livestock to other areas in the search for water and pasture. To be able to identify the key resources, there are certain features in the landscape that are searched for. These features are indicative for availability of water and probably pasture. There are also some aspects of the vegetation that can be taken as indications, such as certain bushes and tree species. These features are important for establishing the best location for the dams and the wells.

For the pastoral livelihood the ability to find water despite the environmental constraints is crucial for living. The dependence on animal welfare makes water in relation to land a natural resource with both social and economic value. To own a well indicates social status as it is an exclusive benefit from wealthy men with many cattle.

The number of livestock, wives and children and his network of economic relations of exchange determine a man's status⁶⁵. Persons with more animals than others have more power to dig and being the owner of a well since they can hire people due to their higher access to assets. The man (husband) thus gains a stronger work force and a larger space to accumulate livestock and attract poor people to work for him. Being the owner of a well, i. g. water, is

thus connected to social status. Water has a social as well as economic value as stated in the IWRM principles.

During droughts animals are lost which is economically devastating. One of our informants went off during the last two years drought with his 39 cattle in the search for water and pasture, but unfortunately he returned with zero. When the livelihood is based on animal welfare, water and its integrated use with land becomes the most vulnerable and important resource. To understand the dry land pastoral livelihood the principles of IWRM are highly relevant and applicable, since they emphasize on water as a finite resource that must be considered as part of an ecosystem where it is related to other natural resources.

In the next paragraph we will discuss the features that are taken as indicators of pastoral key resources in the area, which the herders search for when they are finding water and pasture for their animals.

⁶⁵Thor, 2009

6.3 Indicators of key resources

Indicators of key resources mean that in order to be able to locate water the landscape as a whole is monitored. Before settle down, the community members locate where key resources are available and thus look for specific features. This means that when a dry period comes, they know that water and pasture is close. It is also easier to dig a well (or construct a dam if resources are available).

In the field we learnt from the informants that there are several features indicating key resources that they search for. There is a tree; the *acacia* tree (Figure 15), which is resistant to drought. It provides nutritious food for livestock and can be taken, as an indication of that water is stored close to the ground surface. The water body is located on 1-2 metres depth from the ground surface and is accessible by using a spade, a *jembe*, a tool used for digging, or a mattock. Usually a well with a diameter of 1-3 metres is dug at such places and used for watering the livestock. Research on dry land pastoralism confirms the importance of acacia bush lands as important fodder for the livestock and its provision of water⁶⁶. An additional tree species, the *Baobab* (*adansonia digitata*) (Figure 16) can store large amounts of water in

⁶⁶ Barrow et. al., 2003

the trunk⁶⁷. Water can also be stored in caves or under large stones. During the rainy season these are filled and the water does not evaporate easily since the water is not exposed to the sun. Stones with cracks or hollows are filled with water during rain and may contain sufficient water for a herd of livestock.



Figure 15 The acacia tree is characteristic for the landscape in dry lands and an indicator of key resources. Photo: Taken in Samburu District, 2010

⁶⁷ Lindholm, 2006



Figure 16 The baobab tree contains water persistent during dry seasons and is a key resources indicator. Photo: Taken in Samburu District, 2009

There are a number of geomorphologic features that indicates water bodies near the ground surface. In order to locate these, the Samburus observe the landscape shape. By following the topography and associated drainage lines (Figure 17) to the foot of the slopes the place for digging a temporary well can be located. At the foot slope the water penetrates the soil and may be stored near to the ground surface if the geological circumstances are right. The pasture in such areas is wet and thick indicating availability of water. Scoones⁶⁸ identifies these areas as “valley bottomland wetlands” which basically consist of headwater depressions, inland valleys or drainage basins, i.e. areas that function as sinks situated in the end of drainage lines. Also thick grass (Figure 18) indicate high amount of water and is often surrounding a permanent water source. Animals favour the grass during dry seasons since it contains higher amount of water and it is likely water is nearby.



Figure 17 Drainage lines are indicators of water as a key resource. Photo: Taken in Samburu District, 2009.

⁶⁸ Scoones, 1993



Figure 18 Thick grass is favoured by animals during dry seasons and indicates availability of water. Photo: Taken in Samburu District, 2009.

Large amount of wild animals migrate in the search of water and pasture (Figure 19). Spoor of wild and domestic animals can function as signs for water resources. The pastoralists read animal's footprints; many footprints indicate locations of water. The larger number of wild animals in an area, the more water there is. Areas with large numbers of wild animals mean however not only water and pasture for domestic animals, but also the possibility to hunt wild animals. The pastoralists use the water points as hunting spots and gain a complementary resource to the livestock economy.



Figure 19 Animals grazing near a water point (tree line in the background). Pastoralists track the footprints and know that water can be nearby. Photo: Taken in Samburu District, 2009.

In the area there are persistent water resources that have been created by humans; two dams and several permanently dug wells located approximately 6 km from the Lorrora village. The dams and the wells have been located on places by observing the landscape as described above. The only permanent water resource is the swamp located 11 km from the village and it serves multiple water users during dry periods. After the initial phase of the drought there is little water to be found in the wells and the dams and in this phase they are used in combination with the swamp. The dams and the wells are considered to be key water resources since they are used during the initial phase of the dry season. Occasionally the dams, wells and the swamp are not able to provide enough with water. During such periods the herders migrate with their livestock to other areas in the search for key resources.

In addition to water the livestock is dependent on pasture. Pasture grazed during droughts is crucial, but water is more important and the indicators for water are sought for firstly. When water is abundant in the landscape, the pasture will also be of high quality. The grazing areas are easier to find and can be better controlled. When a grazing area has been located it will be

sufficient for the dry period by shifting mechanisms, while water must be searched for continuously. When a water point is found pastoralists will use it as a base for a time period, even the whole dry season. They will then find pasture in the surrounding area and come back to the located water point. Availability of pasture but no water means will not make pastoralists to stay.

The key resources are crucial for the Samburu during dry periods and constitute the basis for their livelihood. The community thus settles down close to key resources areas where seasonal and distant water points can be found. The participatory map (Figure 10) illustrates where the key resources are located in relation to the village. The pastoralists also monitor the landscape for the possibility to create key resources as the dam and wells.

One of the key components of the IWRM principles is to manage water with a holistic view, in relation to the ecosystem it is part of. Its management cannot be separated from the components in the surrounding environment. The concept of key resources indicates that to find water the whole landscape must be monitored. Pastoralists search for thick grass, slopes, specific trees etc. Water can thus not be seen as separated from the surrounding landscapes. The pastoral way of reading the landscape can be considered as an IWRM approach.

6.4 Pastoral management of key resources

The whole Samburu community is organised around the cattle and the concept of key resources. Social networks facilitate the cooperation around and sharing of them. There is a traditional management rooted in the community on how to find and decide upon the key resources. The hierarchy determines it where certain groups have different responsibilities and tasks. Figure 8 illustrates the social structure and the hierarchy related to key resources. In general, married women have higher status than morans, but not in the management of key resources. The elders have the power in decisions and conflict resolutions. The migration pattern of livestock, the status of the key resources and where to find them are being discussed by the elders during evening hours in the Naapo, the ritual settlement which has been described earlier. During the morning the *morans*, a group of young men between 15-35 years of age, have been sent out to monitor the landscape and they also assist the evening meeting at the Naapo. Wealthy men own wells and can affect decisions on them as well as other key resources. For dams, the elders (council of elders) manage and decide how the water and the

area around is used; trees are not allowed to be cut because they are important shade zones for animals awaiting water and prevents evaporation of wells. They decide where to locate the wells so they do not cause other sources to dry up or bringing conflicts. Elders also manage the swamp, setting rules for the areas.

During the rainy season the Samburu rely on transient water sources accumulated in potholes and ponds. The morans, or the senders, find key resources for the next dry period. During the wet season, when water and pasture has become more abundant, the livestock is moved from key resources areas in order to allow them to regenerate. Also the dams and wells are allowed to recharge. If the water of a well dries up, it has to be dug again. The owner of the well or the elders thus makes up a schedule of how much water that can be taken from it per day. Relatively close to the village there are areas with pasture, which are left during wet seasons, in order to save pasture for the dry season. They are not supposed to be grazed when pasture is abundant elsewhere and the use of them is restricted.

The use of water points is also restricted during dry seasons. Even now wells and dams are left to rest from one day to another. During this period of water scarcity more wells can be created. This is the time when the Samburu rely on key resources. They migrate to key resources areas that have been left to rest during the wet season. Some places with key resources are being fenced in order to preserve them from wild animals.

The key resources are used during the dry periods and when the rain starts the Samburu migrate to the peripheral areas with more transient resources areas so the key resources do not get exhausted. During the wet season, when water and pasture is more abundant, the livestock is moved to other areas in order to allow the water and the pastures of the key resources to regenerate. Some places with key resources are being fenced in order to preserve them for next drought period. When the non-equilibrium environment does not have any water or enough pasture, the preserved spots can be used to maintain the livestock. Since there are almost no permanent water sources in the area the Samburu are highly mobile in the search for it. Before they make a large-scale migration to an area they monitor the landscape for important features that indicates key resources. The community settles down not less than 20 km from identified key resources but also needs access to health facilities, schools and markets for selling their products. Seasonal movement of livestock to access water and grazing resources is another strategy to cope with the varying environment.

The pastoral dry land with its environmental constraints has challenged the Samburu to find water and pasture during drought, searching for key resources indicators. They have developed a dynamic efficient production system. The defined roles in monitoring and decision-making are the key strategy for facilitating the key resource management. The communication between community members on where to find and how to manage the key resources is based on kinship and social relationships. This implies that cooperation on the key resources is the basis for surviving in the pastoral dry land. By commonly decisions regarding restrictions on and protection of key resources areas secure water and pasture for the dry season.

6.5 Conflict Resolution Mechanisms

Conflicts erupt between individuals, families and communities mainly around water sources. The elders are highest in the hierarchy and for this reason they deal with the conflicts within the community. They meet in the Naapo where they decide who should be fined with money, cattle or restriction on resources (e. g. water). When there is a conflict between communities the government cannot operate without the help of the elders. Governmental officials meet with them because they are the link between conflicting groups and the government. The elders are the most powerful in the conflict resolution process; they separate women, men and young people to discuss the conflict and come up with their own points. The elders then hear them together and discuss upon it whereby they make decisions on actions in the conflict. However, as presented earlier, a wealthy man can intervene in decision-makings and affect the outcome of the process.

There are changes occurring in the area that are related to key resources. The Samburu community has faced challenges in how to address the arising issues. Climatic as well as human factors have threatened the availability of water and pasture and have had devastating effects on the Samburu community.

6.6 Current changes affecting the key resources

The findings on current changes affecting the key resources were based on our previous knowledge of the study area. One of us is from the region and has regular contact with the

Samburu community. The perception was therefore that people in the area have been struggling with drought, privatisation and conflict in relation to water and pasture. These were thus the issues that were addressed during the field study. By the literature study it became clear that the most common threats to dry land pastoralism are diminished owned land, lack of rainfall and conflicts between communities and individuals⁶⁹.

The rainfall graph of year presented in the result indicates that rainfall is erratic and unpredictable. It does however not show a long lasting drought. No statistics were found in the study area on the absence of rainfall in the period 2008-2010. But from December 2008 up to January 2010 the drought killed several cattle and many herders and their families lost there Livelihood. Their income of living is highly related to the access of water, which became extremely obvious during the drought period.

The most serious threat related to water availability in this area is thus dry periods and droughts. When the dry periods are too long, i.e. the rain is not coming according to its irregularity and unpredictability, the drought induces high pressure on key resources, which make them to be exhausted. When we arrived to the area many of the informants had been far away from the village over the whole time period, in order to find water and pasture for their cattle. Pastoralists can survive the extreme climate variability with its dry periods by key resources areas but the survival strategy does not resist droughts. Hence key resource areas reach beyond their carrying capacity level and both livestock and humans die from droughts. Climate change may increase the occurrence of droughts and thus the limitations on maintaining the dynamic nature of pastoralism.

Commonly shared land with water points and pasture is a precondition for the pastoral livelihood. Some of the Samburu are, however, claiming that their access to some areas with key resources have been restricted. There is no recent documented evidence on that commonly owned land is diminishing in a way that threatens the pastoral livelihood. Regarding the colonial and post-colonial past however, where pastoralists have been squeezed into marginalised areas due to the perception of pastoralism as an efficient and degrading land use⁷⁰, it is possible that the trends of marginalization of pastoralists as a group still prevail.

⁶⁹ Food and Agriculture Organisation, 2002

⁷⁰ Sullivan & Homewood, 2003.

The report on privatisation is limited to be a subjective perception from our informants among the Samburu pastoralists. And regarding the lack of documented evidence, it cannot be taken as a stated fact.

Our informants perceive that private landowners have taken control over water points considered as key resources by the pastoral community. Water points, i. g. two dams, have been fenced, serving multiple purposes such as irrigation, watering animals and generating electricity. Also areas that were commonly owned by the pastoral community and allowed for flexible and seasonal movement with herds have become private. Community members fear that more key resources areas will become inaccessible because of the extension of private land. They mean that privatisation has contributed considerably to the water scarcity in the area, increasing the pressure on the still existing key resources. The current trend imposes that herders have to walk longer distance with their animals and migrate more often.

Privatisation of key resource areas complicates the possibility for pastoralists to practice their livestock herding system. The pastoral livelihood requires commonly owned land where herders can move freely with their livestock. The livestock herding is based on dynamic migration, where the access to land is of outmost importance in order to graze and water animals. The ecology of the environment with spatial and temporal variability of rain and vegetation resources induces mobility and flexibility of livestock herding⁷¹. The key factor in the pastoral livelihood is the access to key resources, which can be found within a broad area. The commonly owned land can thus be considered as crucial. And if privatisation is excluding herders from key water points, it is a severe threat to the pastoral livelihood.

The water scarcity resulting from droughts and privatisation does also result in intense conflicts between different pastoral communities. During the dry periods and prolonged droughts conflicts arise and intensify around water and pasture. The conflicts can also be between individuals and families and are addressed within the conflict resolution mechanisms of the elders. The five-year conflict between the two pastoral communities, Samburu and Pokots, has however not been possible to solve within the community⁷².

⁷¹ Agnew & Anderson, 1992

⁷² Thor, 2009

There are specific areas that Samburu avoid to enter due to serious conflicts. We were introduced to areas with high thick grass that had not been grazed due to the five-year conflict. There are key resources areas that are no longer used although they are situated close to the village. This is because the areas are also close to the rivalling community. There was a period of some months when using the water in the dams and wells imposed high risks to loss of lives and cattle raids since the conflicting community guarded the water during the drought. The conflict has forced Samburu to restrict the areas where to find key resources. They have also migrated to find new settlements with key resources areas during the conflict.

The end of the conflict came in January 2010 on a governmental initiative. A peace meeting where held in February at the Amaya River located between the two communities. The river was the first key resource at which the conflict arose.

It thereafter spread to other key resources as the rivalling communities raided cattle close to the homesteads and also used and guarded water and pasture normally used by the other community.

Reoccurring droughts and privatisation increase the pressure on water and pasture, and on key resources areas. The rivalling pastoral communities both depend on these resources and the water scarcity leads to conflicts. The conflict induces unsustainable use of resources and the management system is disrupted (Figure 20). Key resource areas are not left to recharge and abandoning some areas dissertation of some areas increase the pressure on others.

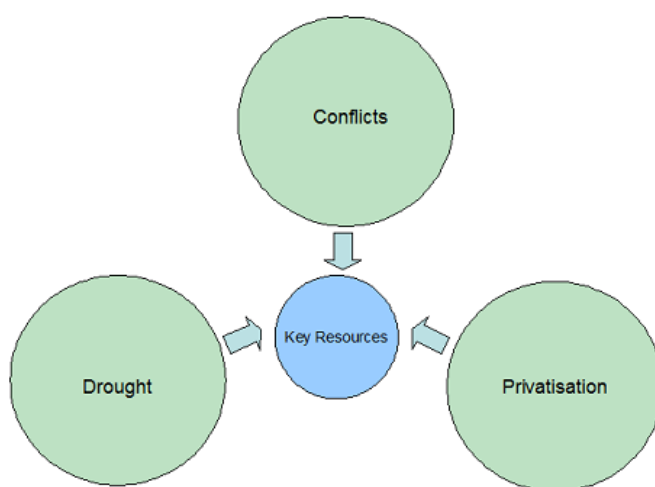


Figure 20 The current changes affecting key resources are drought, privatisation and conflict.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATIONS

7.1 Conclusions

The Samburu are pastoralists dependent on the welfare of their cattle and thus water and pasture. They live in a non-equilibrium environment where they rely on key resource areas of equilibrate character. They have developed a management system based on social mechanisms with internal communication and platforms for decision-making. The social networks are the key strategy for the local livelihood, as well as the mobility in search for water and pasture, and the flexibility and organisation of settlement. In the Samburu dry land water is a vulnerable resource with limited availability. It has an economic and social value and must be seen in relation to land. Drought and conflicts have been affecting the availability of key resources. Further studies are needed to state whether commonly owned land is diminishing in a way that is threatening the pastoral livelihood. Applying the theoretical concept of key resources and IWRM is fundamental for gaining a better understanding of dry land pastoralism water and land management.

7.2 Recommendations

We have extended the knowledge on which the key resources are and how they are being managed in the pastoral community of Samburu. For securing the livelihood for the local community we suggest maintenance of the current management system and creation of more water points as a way of improving the status of key resource areas. An example is the dam constructed by a NGO. Key resources can be better protected if governmental and international development policies and incentives regarding land use and ownership take the key resource concept into consideration and why commonly owned land is important for the pastoral dry land livelihood.

The current changes of drought and conflicts are affecting the availability and access to key resources, even privatisation according to the Samburu. A following step to this paper could be further research on the causes of the changes, how they are affecting the Samburu and how the situation can be improved. The effects of climate change may be the most serious challenge for the dry land pastoralism. For the sustainable livelihood for the Samburu more research on climate change and its consequences in the area should be undertaken. The

characteristics of the conflicts need to be analysed so that appropriate interventions can be undertaken by NGOs working with conflict and peace interventions, or by the government, as has been the case between the Samburu and the Pokots. It is also crucial to investigate further whether commonly owned land in Samburu is diminishing in a way that is threatening the pastoral livelihood. For further research on dry land pastoralism, IWRM can be a useful concept to address these issues and to identify common water needs for the pastoral community in Samburu.

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