Social differentiation and adaptive capacity to climate change among a pastoral and agro-pastoral community in the Northern Rift of Kenya

A Case study of Il Ngwesi Group Ranch community members

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1. INTRODUCTION
1.1 General Overview

Over the past decade, climate change has brought significant challenges to pastoral communities living in communal drylands of Kenya as they highly depend on the natural ecosystem to support livestock, their main source of livelihood. These communities describe their climatic challenges as comprised of prolonged and severe droughts, long periods of dry and hot days, reduced rainfall amount and unreliable rainfall patterns. The consequences of these frequent and extreme climatic conditions as explained by community members are: reduced availability of pasture and water, and high livestock mortality rate. The situation threatens the existence of pastoralism and the livestock industry whose traditional means of coping with climate variability has been to move from one place to another. Moreover, the livestock industry significant contribution to the country’s economy and food security is put at risk. Traditionally, pastoralism and subsistence rain-fed farming have been an integral part of these communities livelihood. They are aware of the environmental challenges, facing them and are engaging in adaptation practices using locally available but diminishing resources.

Understanding institutions around land among other resources available in drylands is critical to building adaptive capacity of the residing community.

The general question on the socioeconomic and technical process of climate change adaptation by a pastoral community in transition remain unaddressed in literature. The Local Governance and Adapting to Climate Change in Sub-Saharan Africa (LGACC) research project implemented by World Agroforestry (ICRAF) and International Livestock Research Institute (ILRI) aims at addressing some of these concerns. Through a research project case study commissioned in Kenya and Burkina Faso drylands the project identifies characteristics of land governance systems and property right regimes likely to increase household adaptive capacity across agro-pastoral communities in sub-Saharan Africa. Communities selected are characterized by mixed livestock and crop production systems and are highly dependent on communal land and natural ecosystems.

The research project is divided into seven work packages: scoping baseline study (identification of the research sites), governance assessment, asset assessment, social differentiation adaptation case study, future scenario analysis, decision-support tool development, as well as communication and outreach. These work packages have different tasks and various activities. Governance
assessment identifies systemic socio-institutional structures of Natural Resource Management (NRM); the asset survey describes socially-differentiated access to resources and finally the adaptation case study work package presented in this report documents how differentiated groups of people draw upon their social and material resources in the pursuit of climate adaptation. The report characterizes adaptive capacity as a socioeconomic and technical process where a suite of practices are embedded within broader livelihood strategies. The output of this work is based on ethnographic methods: Focus group discussions, key informant interviews, semi structured interviews and participant observation. The study primarily uses qualitative and inductive methods to unpack how adaptive capacity is social differentiated in unfolding new practices.
1.2 Background Information

Adaptive capacity is socially differentiated. Evidence of this is in the new practices that are unfolding among pastoral and agro-pastoral communities due to ongoing changes in socioeconomic and technical processes. The community in this study refers to the registered members of Il Ngwesi Group Ranch are from the Maasai ethnic group. Three main aspects of social differentiation: wealth, age and gender influence the adaptive capacity, community diversification strategy and adaptation practices (Little et al. 2016). Climate change for example presents different opportunities as well as challenges to different genders (IFAD 2009). Gender bias leaves women more vulnerable and unable to access key resources with direct impact on food security, adaptive capacity and poverty levels (FAO 2007).

Adaptive capacity refers to the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities or to cope with the consequences (IPCC 2007). Il Ngwesi household adaptive capacity is based on adaptation practices embedded in the communal land and collective action of the general community as well as at household level due to a changing trend towards more individualized actions. As debated by Adger, (2003) the adaptive capacity of a society is their ability to act collectively. Hypothetically a pastoral community undergoing socioeconomic transformation toward more sedentary livelihoods has reduced ability to act collectively. The question of interconnections and relationships between the three key dimensions of social differentiation and their influence on adaptive capacity becomes paramount and needs to be answered effectively. This is especially the case when it comes to how households within this transformation are accessing key resources that influence the development and uptake of adaptive practices, as well as the implication of these differentiation in implementation of adaptation practices.

Analysis of the intersections between wealth, age and gender in adaptation practices inform policy interventions that recognize various social aspects of a community in transition that either build their adaptive capacity or makes them vulnerable. Gender roles for example are analyzed as a social aspect within the community to understand its contribution and influence on uptake of new practices. Financial wealth, livestock herds and ownership of land, exposure and information would differentiate the ability of various households to uptake new practices. Technically, for example skills and access to information builds the ability of one households to engage in new
practices. These are incidences that would bring inequality and hinder general community adaptive capacity. These elements are relevant in illustrating how adaptive capacity is socially differentiated in unfolding new practices among the agro-pastoral community.

To effectively discuss with the community on adaptation practices, it is first important to understand their perceptions of climate change because community adaptation of new livelihood practices emanates from how they perceive environmental changes than from actual information generated by scientists (Adger et al. 2009).

Using a timeline methodology, the participants of FGD identified various climate change variables and discussed them based on how they viewed the environmental changes. The discussion focused on rainfall amount and intensity, drought severity, long spells of dry and hot days and unreliable rainfall seasons. Rainfall amount was said to vary in seasons, in some it was too much within a very short duration causing flooding while in others it was too little to support any grass regeneration and maturity. The community connected rainfall seasons scenario to natural pasture regeneration and availability of water for livestock. Drought was said to be prolonged, severe and frequent. Consequently, the recovery period for household to bounce back from one loss to another were reduced, leaving them even more vulnerable. The discussion on long spells of dry and hot days were based on the period between one rainy season and the severe dry spell that propelled the households to migrate their livestock. Some homesteads were said to have migrated with the livestock and did not return even after the rains because the pasture was not enough. These are the issues that inform community perception of climate change. In rain-fed agricultural neighborhood like Ethi, where wheat is produced in large scale, unreliable rainfall season affects planting time decisions. Crop failure among the Maasai community has a significant impact and many households shun away from crop based rain-fed farming. They consider it immobile and therefore more risky in comparison to livestock. In cases like wheat farming, there is high possibility of complete loss yet initial capital investment is quite high.

Pre-colonial policy interventions coupled with changing land use dynamics and property rights in communal Maasai land are largely responsible for declining trend in pastoralism due to reduced resource access, mobility and erosion of customary institutions and imposed privatization (CAPRi 2005). This undermines the social economic lifestyle of the Il Ngwesi Maasai based on nomadic pastoralism as the primary activity, which is compounded by progressive climate stress. The Il
Ngwesi community after the 1982/83 drought lost over 75% of their livestock. As drought became severe and prolonged, the livestock were getting weaker by the day and by the time many households decided to take them to Mt. Kenya, the only place that had pasture, they were too weak to withstand the cold. This was a major turning point as pastoralism and livestock sector were at stake. A year later, the 1984-85 drought hit the area and its impact was heavily felt since the recovery period was too short from the previous one. A respondent who had 30 herds of cattle came back with 3 and complained of never having been able to recover from this loss to date, unfortunately this respondent was shot while harvesting honey during the 2017 drought and insecurity in the area. Climate change is clearly an additional stress to a community already going through multiple challenges like insecurity, water unavailability, livestock pests and diseases, human wildlife conflict, poor infrastructure and road networks and lack of livestock market. These challenges affect households differently. The capacity of women to deal with the additional stress intensifies inequalities (IFAD 2009). For example, droughts increase women’s and girls’ labor burden as it requires them to travel long distances to fetch water and firewood, thus reducing their ability to engage in other means of diversification, or schooling for girls.

The droughts of the 80’s were equally intensified by land fragmentation which hindered accessibility and mobility of livestock in search of pasture and water. Upon a desperate return home from Mt. Kenya, the Il Ngwesi community made a collective decision to pursue an alternative source of livelihood. The innovative idea was community wildlife conservation and eco-tourism. Il Ngwesi’s decision to make wildlife conservation a source of livelihood was equally influenced by their neighbors: Borona Conservancy and Lewa Conservancy, who were equally finding their feet on the new venture. The implication of this decision was to surrender the communal pasture land giving room for eco-tourism development. Individually, the households began to resettle in various areas outside but near the ranch. This movement although collectively encouraged, depended on the resources and ability of individual households to relocate. The new setup required individual households’ to have access to diversified livelihood sources. This marked the beginning of individualized action to tackle personal challenges as collective action diminished in importance.
Pastoralism is defined as a production system where more than 50% of household revenue is generated from livestock and livestock products (Berkes, Folke, and Colding 2000). In the Arid and Semi-Arid Lands (ASAL) of Kenya it is defined by its principle features of livestock mobility and the communal management of natural resources (Government of Kenya 2015). This is however changing due to sedentarisation of the community leading to more individualized modes of action and production (Government of Kenya 2015). The new practices among the Il Ngwesi community tend towards a continued transition from pastoralism towards agro-pastoralism; crop based agriculture and non-agricultural activities like tourism and business. Agro-pastoralism is a production system where more than 50% of the household revenue is generated from crop farming and the rest 10-50% from livestock (Berkes, Folke, and Colding 2000). This livelihood strategy lessen the community dependence on livestock system. The term “community” is used to mean definable aggregation of households interconnected in some way and with a limited spatial extent (Coombes, Green, and Owen 1988). In this case study, the community in reference is the “Lakipiak Maasai” which means “people of wildlife”, the registered members of Il Ngwesi II Group Ranch who converted their communal land into a community wildlife conservancy and eco-tourism.

This report reviews three aspects of social differentiation: wealth, age and gender, their interconnectivity with households’ ability to influence uptake of new practices and reshaping their adaptive capacities. Insights from this review with respect to access and management of communally-held natural resources informs policy makers and relevant stakeholders on social institutional dynamics that reinforce or reduce social inequalities of pastoral and agro-pastoral households. The interconnectivity will be critical for informed decision-making in future investment and interventions.

1.3 Statement of the Problem and Research Objectives

A community whose coping strategies to climate variability were dictated collectively is increasingly moving towards household and individual actions in dealing with climate change. This report approaches adaptive capacity and social differentiation from a community system perspective to a more individualized households’ systems. This broadly originates from the premise that community pastoralism is a system where the community is in transition to privatized agro-pastoralism, more diversified and individualized household actions. This transition implies diminishing collective coping strategies and an increase in privatized adaptation practices.
The Maasai pastoral system is well documented in literature, however the fundamental issue that is not adequately addressed by literature is how adaptive capacity is socially differentiated, lending new practices that are adaptive to climate change. There is need to unpack how adaptive capacity is socially differentiated in order to address and integrate social heterogeneity in climate change adaptation processes, including the increasing needs and dynamics of women roles in development interventions and research (IFAD 2009).

**The Overall objective:** The objective of this research is to undertake a conceptual and empirical assessment of adaptation practice to climate change among the pastoral and agro-pastoral households in Kenyan drylands. The specific objective is to analyze how adaptive capacity is socially differentiated in a transition community. The main theoretical lens used is social differentiation through the aspects of wealth, age and gender around adaptation practices.

The objective is derived from the following **research questions:**

i. How is access to key resources (material, knowledge, social, etc.) that contribute to adaptation practices socially differentiated in the Il Ngwesi community?

ii. What implication do the various aspects of social differentiation have on engagement in (and benefit from) adaptation practices?

**1.4 Report Structure**

Section 1 has provided the general overview of the study, background information and justification of the research, overall objective and specific objectives and finally the research questions and the outline of the report. Section 2 will discuss the general research design and methods used to investigate the main topic of adaptive practices. Section 3 will explain the conceptual framework used in the study. Section 4 will discuss social differentiation and adaptive capacity as embedded through three practices: establishment of a community conservancy, collective and individual fodder production and management and community rotational grazing units as adaptation practice and finally section 5 will wrap up conclusion and recommendation.
2. RESEARCH DESIGN, DATA COLLECTION AND ANALYSIS METHODS

This section outlines the research design, data collection methods and the analysis engaged in the study. These include sampling methods, how the research was conducted and analytical approach used for data analysis. The research presented relies on qualitative and inductive methods to unpack how adaptive capacity is socially differentiated in unfolding new practices among the pastoral and agro-pastoral community. The methods engaged in addressing the research questions are gender disaggregated Focused Group Discussions (FGDs), participant observation, semi-structured interviews (SSI) and informal interviews.

The registered members of Il Ngwesi Group Ranch were traced to various locations where they have resettled after migration from the communal land. This broadened the case study boundary to include parts of Meru and Isiolo counties, both neighbouring Laikipia County (figure 1).

![Figure 1: Study site villages and counties](image-url)
These areas they settled are aggregated and referred to as “neighbourhoods” (Table 1) composed of one or two villages based on their group ranch constitution. The neighbourhoods are geographically distinct and vary by land tenure system, climatic condition, topography and social economic patterns. This plays a key role in determining their engagement in pastoralism or in agro-pastoralism.

**Table 1: PRA sites, Administrative Units, and the Villages**

<table>
<thead>
<tr>
<th>No.</th>
<th>Counties</th>
<th>Ward</th>
<th>Villages</th>
<th>Group Ranch Neighbourhoods</th>
</tr>
</thead>
</table>

**2.1 Research Design**

*Case study.* A case study method was used as a means of conducting an in-depth empirical inquiry of the Maasai people who once lived in a communal land, their perception and interaction with the changing environment and changing dynamics in their social relationship with each other and the trend towards more individualized practices. This study has a specific focus on assessment of practices and changing climatic conditions within a contemporary community and a case study was preferred as a data collection method due to the complexity of the system. Robert K. Yin (1994) explained that case studies are preferred to answer the “how” question in real life circumstances.

The two research questions address the “how” and the “what” elements of adaptation strategies to climate change making it an explanatory case study that would investigate causality in complex real life practices (Winston M. Tellis 1997). The unit of analysis was the actions and practices.
taken by the households either collectively or individually as adaptation strategies to climate change. Multiple case studies were selectively identified and became the basis for assessing social differentiation within adaptation practices. Multiple sources of data were used to validate the evidence; Focused Group Discussions (FGDs), Semi Structured Interviews (SSI), Participatory Observation, desk top and document review, all of which were conducted by the researcher. A designed case study protocol and interview guidelines were used to ensure generalization, reliability and consistency. The case studies were manually analyzed by the researcher who deducted interpretation and evidence for recommendations and conclusions.

Period and duration. The fieldwork was conducted from May 2016 to August 2016. The importance of this timing was to experience the impact of short rainy seasons (March –May) and the following dry season. This gave the researcher an opportunity to observe the transition process from a wet to a dry season.

Field Research Assistance. The researcher expressed the need for an assistant during the familiarization meeting with the leadership of the Mugogodo East Ward (Table 1) and the Il Ngwesi leaders residing in Ngare-Ndare. A former group ranch board member, Stephen Ole Giricho was requested to take up the position as the research assistant. A widely recognized community member and leader. This was not the expectation of the researcher and this selection had both pros and cons. His presence made access to the community easy because he was known as a leader, he knew every corner and route and navigating the harsh terrain with his motor bike simplified the traveling logistics. He personally knew the leadership in each village and had their phone numbers and could mobilize for meetings on phone. He spoke the local Maasai language and was fluent in English. This made his communication with the researcher easy. He understood the purpose of the research and would explain the same in the local language. This notwithstanding, his leadership position was intimidating especially to the women who culturally do not hold high position in the presence of men. To solve this challenge, during the women FGD meetings, the research assistant introduced the topic and the researcher as he handed over the meeting to her. The researcher in return choose an interpreter among the women and allowed him to walk away from the meeting venue. He only stayed in a group if they would not identify a woman who knew the national language. His knowledge of the city and the preconceived ideas
about the researching organization gave bias information to the research participants. Upon this realization, the researcher took time to carefully explain the research organization and what the acronyms meant and their mandate in the research project. His main task was to mobilize the research participants, introduce the purpose of the meeting and the researcher and interpret the discussion. He provided motorbike transport and security.

Laikipia and the neighboring counties unfortunately have been experiencing harsh environmental conditions which has sparked conflict and cattle rustling among the members of Il Ngwesi and the neighboring communities. This current violence unfortunately led to the death of the research assistant who was shot in a company of some Il Ngwesi leaders. The story has it that he and the team had followed footsteps of his livestock and that of his father in law all the way till Samburu County. They negotiated with the Samburu elders and were given back only to be attacked by the young men where he was shot dead. In additional a key research participant was equally shot while harvesting honey in Mugogodo forest.

**Study site:** Il Ngwesi Group Ranch situated in the Kenyan Savannah on the Northern part of Mt. Kenya is communally-owned by “Lakiapiak” Maasai. It is based on a community land management and wildlife conservation model, among the few community projects in Kenya supporting a Rhino Sanctuary. It manages the only upmarket Eco-lodge both owned and run by the community in northern drylands. It runs other projects like women enterprises, community health, education, water and infrastructure. It is an enterprise that combines eco-tourism with sustainable environmental management and community development. The community land covers 8,675 hectares. Abuts Isiolo District to the east, Lewa Wildlife Conservancy to the South-east, Borana Conservancy to the South-west and Makurian and Lekurruki Group Ranches to the West.

The group ranch topography is divided into two. The low lands and the highland forests. Many activities such as livestock rearing, crop production, eco-tourism activities and projects like Eco-lodge, Il Ngwesi Banda’s, Cultural Boma, camp site and camel trek are witnessed on the lowlands. On the highlands less tourist activities are witnessed: livestock rearing, rain fed agriculture, settlements, wildlife and forest conservation are some of the activities.
Data was collected in the settlement area which based on their group ranch constitution are referred to as “neighbourhoods” (figure 1). There are seven neighbourhoods based in three administrative wards in three different counties (Table 1). Sang’a neighbourhood composed of Upper and Lower Sang’a villages is found inside the conservancy on the highlands. Nandugoro/Lukusero, Chumvi, Ethi, Ngare-Ndare/Manyangalo, Leparua and Ngare-Sirikon are outside the conservancy. Olchurai and Cultural Boma villages are found on the lowlands inside the conservancy but do not form a neighborhood of their own. They are served under Leparua and Ngare-Sirikon neighborhoods.

Sang’a neighborhood, Olchurai and Cultural Boma villages. The households in these four villages live inside the group ranch, with no individual land ownership. Any strategic decision is made at the ranch level and not at the household level. The main source of livelihood is pastoralism. Limited rain fed cultivation for subsistence takes place only in Upper Sang’a village. The residents of Olchurai and Cultural Boma benefit economically due to their proximity to the eco-lodge through tourism as they display their culture, art and bead work.

Nandugoro/Lukusero Neighborhood. Is located in Mugogodo forest, a government gazetted forest where the administrative authority is under Il Ngwesi Group Ranch Management and the Community Forest Trust. It is situated on the western side of Il Ngwesi Group Range and neighbors Sanga neighborhood and Borana Conservancy. It is on the highland forest area receiving moderate rainfall which ensures availability of pasture for a longer time than the rest of the region and access to forest pasture. Livestock farming is prominent with sheep as the main species. Limited rain fed crop production takes place due to human-wildlife conflict. Fencing of farming spaces using timber from the forest to keep off elephants is done individually, resulting to “privatizing” the land.

Ngare-Ndare/Manyangalo Neighborhood. This neighborhood is composed of two villages Ngare-Ndare and Manyangalo. Ngare-Ndare is partly in Laikipia and partly in Meru County. Manyangalo is a small landscape of 350 acres in Meru County and surrounded by Lewa Wildlife Conservancy. The two are approximately 5km apart. The land is under private land titles. Ngare-Ndare neighbors the Ngare-Ndare Forest and the Ngare-Ndare River passes through giving them an opportunity for small scale commercial irrigation. High value horticulture crops like spring onions, French beans, garlic are produced. Manyangalo village is occupied by many tribes.
predominantly the Meru, Maasai, Kikuyu, Borana and the Turkana. Small scale irrigation equally takes place based on water projects from the mountains and this gives the area a green landscape.

**Chumvi and Ethi Neighborhoods.** These two different neighborhoods have private land tenure system. They border Ngare- Ndare to the South and West. Ethi has a higher elevation (2000m absl) than Chumvi and receives higher rainfall amount in comparison. Rain-fed wheat, maize and peas is observed. Chumvi is relatively dry in comparison and has severe water challenges limiting both rain-fed as well as irrigated farming.

**Leparua and Ngare-Sirikon.** These neighborhoods are in the lowland of Isiolo County. They have a low elevation and low rainfall amount. The land is under government trust and community ownership is not clear due to an on doing case in the Kenya Courts. This lack of clarity brings many pastoral communities in the area in search of pasture and water, resulting to conflict and insecurity. Amidst this controversy, de facto “privatization” of land is evident where households fence particular land spaces, as a sign of ownership, construction of permanent structures like houses, business premises and private schools. The owners of these premises have no legal ownership of the land, but they hope that one day when the issue is settled these portions will be allocated to them legally. Irrigated crop production takes place along the river banks using furrow irrigation and only done by the few who have access to this parcels of land. Majority of the others are pastoralist a few have diversified and even migrated to Isiolo town for trade and business.

**Protocol.** The interview tools were prepared before the actual field work and were informed by two reconnaissance visits and landscape transect drives conducted in October 2015. The first was conducted with the larger LGACC project team members. Visits to various key stakeholders were done like Kenya Wildlife Service, Ministry of Agriculture, Laikipia Wildlife Trust, Ministry of Land among others. It culminated in a workshop with the community leadership where key issues were verified. Questions like causes and sources of conflict, the holistic approach to conservation and benefits of converting a group ranch into a conservancy were addressed.

The second reconnaissance visit focused on Il Ngwesi group ranch landscape. An observation process on land use practices and systems engaged by the community and issues raised in the previous visit. The protocol was presented and discussed by the case study team members (Todd Crane and Jeanne Coulibaly) and the agreed idea was to remain flexible and interactive.
2.2 Data Collection Methods

Focused Group Discussions (FGD) were used to gather collective information. A total of 22 gender differentiated FGD exercises were organized in the 7 neighborhoods inclusive of respective villages. A range of 10-20 participants were randomly selected with various age groups in consideration. The mobilization was done by the research assistant together with the specific village leadership. An interactive historical timeline process was facilitated and moderated by the researcher. It focused on the main sources of livelihood, the importance of each in terms of income in the household, average number of people practicing, gender importance as well as geographical positioning. Equally, changes in livelihood sources, challenges experienced inclusive of climate change and uptake of new practices and strategies to overcome the challenges were covered. The timeline tool was in reference to the three Kenyan presidential regimes. 20-30 years ago was President Arap Moi, 10-20 years ago was President Mwai Kibaki and the last 5 years was the current President Uhuru Kenyatta. The different topics were freely discussed by the participants, raising interesting views on the topic. The last exercise involved identifying new practices and who are engaged in it.

In some groups, local language (Maasai) was used and interpretation done in Kiswahili, the national language. The entire discussion was recorded and later transcribed. Handwritten notes were equally taken by the researcher. The respondents’ anonymity was preserved by offline recording of introduction session, and no reintroduction when responding to questions. The purpose of the study and the recording was explained to the participants at the introductory session.

Participant observation. The data collected at FGD was supplemented by participant observation, where the researcher participated in grazing livestock in Nandugoro forest with an elder in the village who owned less than 50 cattle and over 100 goats and sheep. In Ngare-Ndare village the researcher participated in tethering three improved dairy cows that grazed within the homestead of an elderly man who owned over 100 traditional cattle and was hosting over 200 cattle belonging to a friend from a neighboring county and over 200 small ruminants. The herd of livestock graze in the forest and come home in the evening. The researcher participated in harvesting of onions and potatoes in Manyangalo where she interacted with women of mixed cultural backgrounds on causal employment. In Chumvi village, the researcher interacted with an organized group of women making beads and sanitary towels. Participant observation enabled the researcher to
observe and collect information that would not have otherwise been said as the members went on with their day to day activities. Specifically, it enabled documentation of livelihood practices in details, gender roles, challenges and opportunities of the practices.

Semi-structured interviews (SSI) were conducted using a designed interview guide. The informants were purposively sampled because they were the individuals engaged in various new practices. They were easily identifiable because they were doing something innovative to overcome the challenges experienced. A total of 17 SSI were conducted. These helped to document the practice, the story of the innovator and the general details of the practice in the neighbourhood. For example, who else is doing it, where did the idea come from and how it is integrated within the homestead. Some of the practices that were documented in this process are: Automatic irrigation kit modification by locals, improvement of local goat breeds to dual purpose goats, bee keeping, processing and marketing, group ranch hay production for its members, irrigation, Maasai women petty business venture, water conservation for irrigation purposes, underground water harvesting & collecting techniques, water project piping to overcome terrain challenges, hybrid chicken farming for egg production, intercropping of garlic, maize and beans to overcome shading challenges. Individual hay and fodder production, informal grazing agreements with neighboring community, dairy cow farming and tethering for home consumption, women in the meat slaughter business, warehouse in the villages and livestock fattening for upper market.

Informal interviews were opportunistically conducted in various often informal places with various people. The researcher met Simon from Ethi village three weeks after the SSI with him in Ngare-Ndare shopping center. The researcher managed to probe for more information on the dairy goat improvement program that the interviewee was engaged in. The researcher participated in Laikipia County budget public participation under the invitation of the Mugogodo East Member of County Assembly (MCA), Paul Shwel. The two plus three other area elders drove in the same vehicle to the venue, Chumvi neighborhood. Along the way we had open discussion of the challenges encountering pastoralism and livestock industry in general and some of the new ideas the community was engaged in like the wildlife conservancy, wheat production and livestock fattening and marketing. The research assistant was very helpful throughout the study. He camped at various study sites with the researcher and spent the evenings expounding ideas and issues raised in the
field that were not clear. He particularly demystified the Maasai cultural age set orientation and the position of women in society.

2.3 Analytical Methods

An inductive approach was used to analyze the empirical data. The researcher took time to understand the individual observations and manually coded for general trends. The entry points of the coding were neighborhood, main sources of livelihood, general challenges, and climate change related challenges, new practices and innovations engaged to overcome the challenges. A second level of analysis was done to identify new practices used to adapt to changing climatic conditions. These practices were either collective or at individual household level. Finally, the third level of coding was the aspects of social differentiation within the individual practices, wealth, age and gender. Comments made by men and women in relation to these aspects were highlighted and analyzed. This made it easier to elicit and draw meaning from the collected data and draw realistic interpretation of the results (Bengtsson 2016), identify themes and possible trends. The domains of wealth coded were social relations, access to natural resources and material resources. The various themes coded in the age aspect were intergeneration, education, knowledge and process of transformation. The gender aspect coded were roles, access to resources and power to make decisions. To triangulate the information given the data was collected from the various neighborhoods and cross referenced with available documents.

2.4 Challenges.

These are noteworthy as all things did not go as planned, resulting to modification or repeat of the PRA exercise. The women’s PRA exercise in Ethi had many young women and one older lady from neighboring Samburu community married to a Maasai. These ladies were of Meru origin married to the Maasai men in the area. Their understanding of the main issues of concern to the researcher was very low. They understood current challenges but had limited historical connectivity. It turned out to be a monologue discussion where the role and challenges of pastoralist women was the main topic with the Samburu lady being the dominant speaker. The solution was to organize another meeting with different participants.

In Lower Sanga village, one of the women’s key role is livestock herding. Mobilizing them for a meeting without having someone to relieve them off their daily duty was a challenge. We solved
this by meeting them early Friday morning. Friday is the day they travel to the market in Ngare-
Ndare. Their main means of transport is a tractor that comes once a week from Borana
conservancy. On this day the men were responsible for grazing livestock. Interacting with the
women at their transport meeting point was a good idea, however there was a crowd which would
not have otherwise been mobilized. This made the meeting less focused and not interactive due to
divided attention. Not all participated due to limited time. We mobilized those who had been left
and were not at the first meeting and conducted another FGD exercise. This too was not very
successful as all the women were young. Another meeting was organized on a Saturday when the
children are at home and were left to care for the livestock.

Culturally the Maasai marry off their girls when they are very young. In some women PRA
exercise like at Cultural Boma, the age range was too wide with some girls too young, and too
naive on issues that were happening in their area and a lot of discussion left to the main lady, often
the midwife.
Figure 2: Focus group discussion with women in Nandugoro village (top) and Il Ngwesi settlement area (bottom)
3. THEORETICAL AND CONCEPTUAL FRAMEWORK

To effectively address adaptation in the community, it is important to understand how adaptive capacity is socially differentiated in addressing climate change impact in the drylands. In assessment or in practice, adaptation is intimately associated with the concepts of vulnerability and adaptive capacity (Smit and Wandel 2006). Adaptive capacity determines vulnerability of households, communities and nations to climate change effects (Downing 1991), however its social dimension depends on how vulnerability is conceptualized (Downing 1991).

The term vulnerability is defined as a function of three factors: exposure, sensitivity and adaptive capacity (Smith and Pilifosova 2001). This does not indicate how the effects of climate change and the adaptation practices engaged are socially differentiated. Osbahr et al. (2010) therefore cautions of oversimplifying adaptive capacity framework and seeing all success stories as transferable due to the spatially and socially differentiated effects of climate change.

Adaptation practices and adaptive capacity in a community in transition is highly influenced by three aspects of social differentiation: wealth, age and gender (Little et al. 2016). These aspects define our conceptual framework to understand how they relate with households adaptive capacity to adapt to the impact of climate change by engaging in new and innovative practices and livelihood diversification.

Wealth: Livestock among the pastoralist has always been the principle form of wealth and identity (Borgerhoff Mulder et al. 2010). Livestock management is relational as it requires water, pasture and labor (Borgerhoff Mulder et al. 2010). Wealth as a social differentiation component requires networking and supportive social relations (Borgerhoff Mulder et al. 2010) within and beyond the community boarders. Other domains of wealth identified are access to available natural resources and household material resources. This indicates an intersection between material, relational and embodied wealth (Borgerhoff Mulder et al. 2010)

Gender: Gender is a social construction classification system to ascribe characteristics of masculinity and femininity (Vinyeta, Whyte, and Lynn 2015). Gender definition based on CARE 2008 is the “social differences between females and males throughout the life cycle that are learned, and though deeply rooted in every culture, are changeable over time, and have wide variations both within and between cultures.” In this report based on the perception of the
community, gender refers to man and woman. Adaptive capacity through a gendered lens defines the practice of men and women as they experience climate change (CARE International 2010). Three domains are highlighted within the gender classification: roles in relation to labor, access to and control over resources and power to make decision (CARE International 2010).

**Age:** In the pastoral communities age as a social differentiation aspect is closely linked with intergeneration transmission that is highly dictated by what is transferred from parents to children and from one age set to another (Borgerhoff Mulder et al. 2010). Other domains that are of importance in this report is information, education and knowledge across the different age sets, and the observed transformation process.

**Figure 3:** Conceptual framework designed to understand roles of three aspects of social differentiation: wealth, age and gender in building adaptive capacity and adaptation practices to reduce exposure, sensitivity and vulnerability to climate change
4. FINDINGS: ADAPTIVE CAPACITY SOCIALLY DIFFERENTIATED

This section will discuss how access to key resources are socially differentiated at individual household level. It is based on various practices identified in the field that contribute to reducing vulnerability and adapting to climate change. It characterizes how adaptive capacity is socially differentiated in households within the Il Ngwesi Maasai, a community in transition from pastoralism to agro-pastoralism. The analyzing lens of social differentiation aspects are wealth, age and gender and how this aspects influence uptake of adaptation practices. The purpose of this analysis is to ensure development projects and policies understand social institutional dynamics that reinforce or reduce social inequalities in a practical environment where households within a community are in transition from pastoral and agro-pastoral in adapting to climatic changes.

4.1 Establishment of the Il Ngwesi Community Conservancy

The establishment of a community conservancy in Il Ngwesi group ranch as an adaptation strategy called for change in how the community generated a livelihood from the group ranch communal land. The conservancy specializes in wildlife conservancy and tourism. Funds are used to meet community needs like schools, roads, health facilities, and grass management roles that would ordinarily have been the government’s role in general together with individualized attention like school bursary and medical funds of its members. In this new dispensation, members of the ranch had to individually plan to relocate to designated settlement areas or privately organize to settle elsewhere. The objective of this section is to highlight how various elements of social differentiation enabled individual households to adjust to this collective decision. The section discusses drivers of the establishment of the conservancy; how household accessed prime agricultural land and the process of land ownership by households; the different ecological characteristics that have influenced other adaptation practices, the capacity of households to utilize natural resources and the role of gender and age in facilitating this resettlement and uptake of new adaptation practices and, finally, a discussion on the three elements of social differentiation as it took shape in this practice.
4.1.1 Drivers of community conservancy establishment and household resettlement

The Il Ngwesi Laikipiak Maasai’s land is under the Land (Group Representative) Act with title deed issued under Il Ngwesi 1 plot 1; and Il Ngwesi II plot 2 registered in 1995. Galaty (2016) argued that the community perceived this legitimatization as a means to negotiate and to achieve collective action. The community was severely hit by the 1984-85 drought that left majority of the households devastated having lost over 75% of their livestock. As a community they made a collective agreement during one of their Annual General Meeting (AGM) to establish a community based conservancy and eco-tourism as an alternative source of livelihood and to reduce over reliance on pastoralism. This was an innovative adaptation practice and it meant surrender of the communal land to create space and a more favorable environment for wildlife conservancy and eco-tourism. This was innovative and also the first community wildlife conservancy in the Northern Rift that is owned and managed by the locals.

Drought as a climatic shock was expressed as the main environmental driver that influenced households’ and community decision to convert their land into a conservancy and to consequently migrate. There were however other environmental challenges like water and sanitation, livestock pests and diseases and human wildlife conflict. Social economic challenges too played a role in influencing the decision as households’ desired access to formal institutions like schools and crop production opportunities and internal drivers like opportunities for trade and investment, population pressure, transport and infrastructure and insecurity.

Summary: Climate change shocks and lack of social economic amenities were the main drivers of households’ relocation from the communal land and outside the designated conservancy area into more individualized spaces. A complex interplay of environmental and socioeconomic factors made the households vulnerable to drought causing over 75% of the group ranch members to migrate from their communal land to more privatized settlement. Conceptually one can argue that the 75% that migrated are those that where better off, an observation that was confirmed by the researcher’s observation. In comparison those who lived inside the conservancy had pastoralism and tourism as their main source of livelihood and the future of these two enterprises is very uncertain due to drought and insecurity in the area.
4.1.2 Households access to prime agricultural land

In principle the decision on where the households resettled was an individual household decision. The profile and the nature of the household head played a critical role in household relocation. Some of the factors that defined his/her role were access and availability of material resources and specifically livestock that would be turned into financial assets; Social connections that included relatives or friends from different cultural extractions, and access to the available land. These aspects differentiated households that would or would not relocate.

Manyangalo for example is one of the villages where some households resettled. It is a fertile agricultural land that sits on a 350 acre parcel of land in the middle of Lewa Conservancy. In the late 1960s, it was a white settlers’ farm largely producing horticultural products. The land, after Independence, was taken up by a government institution, Agricultural Development Corporation (ADC) and the laborers were transferred to this new employer. The land was later taken up by three Provincial Commissioners whose names were coined into the name “Manyangalo”, who later wanted to sell it to a tea factory. These several hand overs and transfers left the laborers vulnerable because of accrued salaries which had not been paid. The laborers, who were of Somali origin had been working in the farm for over 45 years. This sparked a protest and several court sessions were held with the laborers claiming they had nowhere else to go after such a long period of service. The court process was so expensive for the laborers. The next best alternative was to mobilize the Maasai community to cost share. Social relations and friendship played a key role in approaching several male headed households who sold off their livestock and contributed 20,000Ksh towards the court process. This contribution was equivalent to one share of the land.

Upon adjudication of the case and eventually winning in favor of the laborers, they were compensated with ownership of the land. The accrued salaries were settled by individuals getting a piece of the land. This was a better offer than returning back to their original home since it was claimed some could not trace back their roots. They settled and continued farming individually.

The Maasai were allocated land based on the shares, or their contribution and equally bought more parcels of land in various acreage (5, 10 and 20) where an acre was 20,000Ksh. They did not immediately settle in the area although they would access it for grazing and continued with pastoralism in their communal land. The individual households later subdivided and sold some
parcels to other community members (Turkana followed by the Meru and Kikuyu) for farming purposes.

When the turn for the Maasai community to relocate from the communal land came, a few found their place in Manyangalo because they already had land there. Others raised funds and bought land from the new sellers while others inherited from their fathers. Households that settled in Manyangalo are doing irrigated farming.

**Summary:** Establishment of the conservancy motivated households to relocate from the communal land to more privatized settlement spaces. The ability to acquire prime and private agricultural land was influenced first by social relations, ownership of livestock as financial assets and the availability and accessibility of the land. These relations were male dominated as the households approached by the leaders of the Somali laborers were male headed. Males who would quickly convert their livestock into finances and support the court process. Settling in this land opened other opportunities as households would take up irrigation and crop production as a source of livelihood and as an adaptation practice.

**4.1.3 Process of acquiring land in private tenure regimes**

Ngare-Ndare, Manyangalo, Ethi and Chumvi were white settlers’ farms. In Ngare-Ndare for example the white settler practiced both ranch livestock production as well as crop production. In the early 1990s, a research participant explained that his grandfather of Kikuyu origin was working for the white settler in Ngare-Ndare and interacted a lot with the Maasai. When the time came for his employer to dispose of his assets, he and other laborers from Nyeri County got the first priority because they had access to first-hand information and directly negotiated with the owner. Many opted to hold the land for speculation and returned home, but his grandfather chose to remain. He was later culturally inculcated as a Maasai and his family today are Maasai with kikuyu relatives. The kikuyus from Nyeri later sold the land to the Maasai men who preferred parcels that bordered the forest for easy access to the forest for grazing purposes. Access to the land was highly influenced by social relations and financial resources and dictated who settled in Ngare-Ndare.

The formation of community group ranches was initiated by the World Bank in the 1990s. Traditionally the pastoral community did not have a distinct boundary. They had routes and places where they accessed and grazed as they moved from one place to another. Heaps of manure was
left as traces of household settlement. The formation of a group ranch was based on registration of household head and this was determined by where they were at that point of registration or in an area they had been or had left traces. This resulted in an artificial separation of families who now belong to different group ranches. For example Il Ngwesi 1 and Makurian were once a big Maasai community called Il Ngwesi. Today they identify themselves as “am from Il Ngwesi” or “am Makurian” with different geographical positioning and governance structure. The Il Ngwesi community went into wildlife conservancy and therefore the need to relocate while Makurian community went into sand harvesting with no set areas for wildlife. These independent enterprises give members differentiated access and benefits from natural resources based on their membership and identity.

Women were not considered in the formation of group ranches and were locked out of the register. They were considered as members through their male spouse, a process that continues to date. The exemption to this rule was and still is: if a woman was a widow or an elder lady not married but with young sons.

Livestock splitting was traditionally a common practice. This formed a good basis for a man to get an additional wife who would be settled in one region and given a share of livestock to take care of. The household head (husband) therefore determined where the wife settled with the new herd of livestock. This although interpreted as ownership of livestock, it meant the woman would access the products of the livestock but the live animals belonged to the man.

In some regions like in Leparua, land was registered under government Trust. Over the years, lack of clarity on ownership has resulted to “privatization” by government institutions like the military and some by elite Maasai who acquired prime land along the river bench for agricultural purposes.

To date although the land statues still remain, “privatization” still continues using temporary fencing. To settle in these regions, individual household needs to negotiate with the community leadership if from outside the community, otherwise identifiable pastoral community can relocate in an area not fenced, construct a temporary house and move on with day today activities. No financial implication is needed in relation to cost of land.
To settle in a communal land, the household needs to be members of the group ranch, while to settle in a private land regime, the household must meet the financial cost of the land by either purchasing it or renting it.

**Summary.** The households from Il Ngwesi group ranch converted their livestock to financial assets and used it to acquire land, for example the one speculated by the Kikuyus. Land acquisition was a male dominated process since they owned livestock, the financial asset among the Maasai. It was equally based on social relations, knowing someone or being known. Households that were not exposed or had no networking ability had been left out in the initial land acquisition, making it more difficult to acquire later.

The nomadic pastoral system determined which group ranch household heads were registered as members. Over the years, family lineage have followed this membership registration differentiating households based on benefits associated with particular membership. Shift from one register to another was not possible then and it is not possible today especially because registration is based on family lineage. To-date many households reside where they are because of social relations that were historically established by their grandfathers. He was either a laborer, an elite or a wealthy Maasai and or had well established social connections. Women had very limited influence on determining land ownership or membership in group ranches.

**4.1.4 Current process of accessing land for resettlement**

To purchase individual private land in villages like Ngare-Ndare, Manyangalo, Ethi and Chumvi depends on the wealth of the households and availability of a willing seller. Land cost in these four villages varies with the highest being Ngare-Ndare, Manyangalo, Ethi and finally Chumvi. Financial capacity is the main determinant which among the Maasai translated to livestock herd. This is a challenge today due to reduced livestock herds due to high rate caused by drought and other social economic factors. The situation reduces the ability of many households to buy land based on livestock proceeds. Agro-pastoralism enables households to diversify their sources of income and can depend on both livestock and crops. These category of people were observed to have better chances of land expansion since they can access finances from both the livestock and crop proceeds. They also have the right networks and social relations and can easily get access to a willing seller. For example, if they preferred to expand their irrigated farming, the best land
choice is Manyangalo and Ngare-Ndare and the likelihood that they are already settled in these areas is high.

For those who opted to move to land held under government trust, some have put permanent structures and fenced up their land. They hope that one day they will get legal ownership of the land from government. This fencing allows “privatization” of huge tracks of land with no capital investment to the actual cost of land. Some use tree bushes while others use stones gathered and cleared from the farm. This “hope” keeps the households motivated to stay and invest in the area. Their adaptive capacity is arched on the ability of the household to take risks and invest in the land. They have livestock as financial assets and household adaptive capacity is based on diversification into non-farm activities like business.

Those who were left in the communal land have various reasons attached to their decision not to relocate. They easily access communal grazing land which is high motivation for a pastoralist, limited financial resources to invest in individual property, while others prefer the quiet and clean environment. Their adaptive capacity is based on the ability to sustain pastoralism and to benefit from the tourism industry and enterprise like beads and cultural shows. The income meets basic needs; food, school fees and medical. Their ability to build their adaptive capacity by investing and diversifying is very low. First because the rules of the communal land do not allow them to invest in the land, secondly their income cannot raise the funds to relocate to prime agricultural land. There are very limited infrastructures in the communal land for example schools, road network and basic government services. These challenges lock them out of adaptation efforts and development.

Summary: Availability and accessibility of land in the drylands is a significant element in building the adaptive capacity of households. Prime agricultural land enables crop production and households can benefit from both livestock and crop proceeds. Acquiring land is determined by financial resources and social network available to households often through male household head. Those already in spaces of prime land are better off and can expand and build their adaptive capacity than those who would want to join now because they lack the finances and have limited access to information.

Households settled in government land have access to pasture and can engage in livestock pastoralism. Their “hope” propels them to invest in that land, however this is limited due to
insecurity, lack of land and limited access to Isiolo market. The kind of investment needed to build the adaptive capacity of these households needs to first address the collective needs like investment in water harvesting technologies, irrigation and security, and a market and can consequently address individuals actions.

Households living in the communal land benefit from pastoralism as well as tourism related activities. The sustainability of these two sectors is based on availability of pasture, therefore rain and security are critical. These are factors not in their control and increases their vulnerability.

4.1.5 Ecological characteristics influences other adaptation practices

The various neighborhoods where the households settled have discrete natural resource endowments. Ngare-Ndare, for example, is well endowed with water resources that is used for commercial irrigated farming. The households that relocated and settled here build their adaptive capacity by engaging in horticulture farming as an alternative source of livelihood. This production facilitates the household to access financial income every three months by growing short duration crops like onions, French beans and pepper. Their proximity to Ngare-Ndare forest enhances their ability to practice sedentary pastoralism as they graze their livestock and collect other resources like firewood and honey from the forest. Households in these regions identify themselves as agro-pastoralist when their main source of livelihood is crop and livestock production.

The Ethi neighborhood sits at the base of Mt Kenya and receives moderate rainfall due to its higher altitude. Households that settled here are sedentary pastoralist as they access Ngare-Ndare forest to graze their livestock. To build their adaptive capacity, a few are engaging in livestock breed improvement like dairy goats and rain-fed crop production like wheat. Drought however has made this rain-fed enterprise very unpredictable and a risky alternative means of livelihood.

Chumvi village has the lowest market price of land because there are no natural resources, including water scarcity, land degradation and low rainfall. The area is far from Ngare-Ndare forest and women walk long distance to fetch firewood and water for domestic use. Households in this village rely on sedentary pastoralism, however their livestock is often kept away from the households. Their proximity to Timau town offers the young generation off farm activities and business ventures. Livestock manure is a women asset as they are responsible for cleaning the
livestock shade and this generates money for them. They also practice charcoal burning, a maladaptation practices.

Households in communal and government land access large tracks of land where pasture livestock pastoralism is easily available. In the communal land, wildlife attracts tourism and households develop income generating activities around this sector. In Leparua a few households access fertile land along the river and practice subsistence farming. Commercial horticulture production is discouraged by the far distance from Isiolo town, which is the main market and insecurity.

Summary: Access to different ecological resources (land, forest, water, wildlife) by the households based on where they settled defines the practices they engage in and consequently their adaptive capacity. Households in Ngare-Ndare and Manyangalo have reduced their vulnerability by utilizing both the water sources for crop production and the forest where livestock graze. The communal land, wildlife and access to pasture defines the households as pastoralist and builds their capacity by engaging in tourism activities.

4.1.6 Capacity to utilize the available natural resources

Ngare-Ndare forest is an important natural resource available to the surrounding community and households that live nearby. Its usefulness as a source of pasture for livestock is based on the ability of the household to pay the grazing fee. An ecological product that was traditionally provided for free has a grazing fee of Kenya shillings 100 (1dollar) per cow per month. This limits the number of livestock a household can comfortably afford to graze in the forest and it discourages households to own large herds of cattle. The usefulness of a neighboring natural resource to support livestock production is based on financial resources households can mobilize.

Mukugondo forest, a community managed forest is accessible to residents of Nandugoro and Lukusero Neighborhood. Sheep and goat farming is dominant where grazing takes place in the meadows. The production of crops like maize can be seen in patches and surrounded by wooden fences. They have a way of limiting the number of livestock a household can possess as was expressed by men FDG in Lukusero. The non-exclusivity nature of the land attracts immigrants who come in numbers with their livestock from all directions during periods of prolonged and severe droughts. This increases competition for available grass and water. This increases insecurity
and large herds are easy targets for livestock rustlers. Land and weather conditions are not factors that limit crop production in this area like some of the villages. The main challenge is wildlife, elephants which can destroy an entire crop in one night. The residents observe that with proper grazing plans they can have pasture throughout the year, however the non-exclusivity challenge limits households from owning large herds of livestock.

In Leparua, Ngare-Silicon and neighborhoods inside the conservancy residence have access to large tracks of grazing land. The ability of households to herd and migrate determines the number of livestock one can keep. Some spilt their livestock depending on labor available. They have both large and small livestock species. Large animals like cows and camel can be on the mountains within the region for a long time without necessarily coming back at the home base. The family daily needs are dependent on the small shoats which are frequently visible and fed on pods of acacia when it is extremely dry.

**Summary:** Access to available natural resources has an investment implication. It is either financial like the case of Ngare-Ndare forest, or by social relation like in Nandugoro where immigrants limit their potential or labor cost to explore the vast area where pasture is available.

**4.1.7 Role of age in relocation and in building adaptive capacity**

The elder Maasai men (> 70 years), majority are polygamous and practice herd splitting. Their intention of marrying an additional wife is by extension related to labor source for livestock management. The man decides where to settle his new wife and this largely defines adaptation practices this household can engage in. One man was observed to have three households in three different neighborhoods and all practicing different practices: In Ethi: livestock and rain fed farming, Ngare-Ndare: Livestock and irrigated horticulture and Nandugoro Livestock.

The middle-aged male 40 to 69 years are exposed, they have varied resources and independently make household decisions. They practice modern pastoralism where fattening and marketing of livestock is deliberate. They identify areas with grass, negotiate and use it to fatten their livestock for market. This would be on the hills of Il Ngwesi group ranch or in the neighboring group ranches and conservancies. They have motorbikes and mobile and can manage their livestock by employing a herder. They invest in breed improvement by buying male animals (Ram, bull or buck) as seed to change their local breed. Majority are also agro-pastoralist since they practice
farming either irrigated or rain fed. To engage in this some have more than one wife. They have acquired land either through inheritance or purchased through personal initiatives.

The young generation (youth) traditionally goes through various stages and rituals before they are considered mature to marry and move out of their father’s homestead. They have limited access to property and decision making land and livestock sector. They graze together with the father who can sell the male animal without consulting the son, a practice said to be payment for combined grazing. The son’s female stock is used to reproduce and the father cannot sell. They are diversifying to non-farming related activities like tourism, business and employment although they have a low wealth base and their active participation in the group ranch activities is very low.

**Summary:** Age has been conceptualized into three levels: older, middle-aged and the youth. The older generation settlement trend is based on areas where pastoralism is possible, areas with large tracks of land. The middle-aged generation is diverse, have access to resources and decision making and their settlement pattern is based on the practice they want to take up. The youth are vulnerable as they do not have influence on the main sources of livelihood in the drylands, be it pastoralism or crop production. They are moving out of these by engaging in non-farming enterprises like business and employment.

**4.1.8 Gender roles in migration and in building adaptive capacity**

Livestock splitting is a long tradition of the Maasai culture. It was viewed as an easier option than destocking through selling. The livestock owner, the male head, is responsible for making the decision to split his livestock if he views them as too many and unmanageable. This translated into marrying another wife, who would take care of the new herd of livestock in a different location. One respondent explained that his grandfather was a laborer in a white settler farm where he had been allowed to keep his livestock. When they became too many, he was asked to reduce the number. His friend advised him to take them to Sanga village. He married a second wife and settled her in Sanga to take care of the livestock.

His first wife of Kikuyu origin had never experienced this and she was so bitter that, she chose to return to her parents’ home in Nyeri County. This decision gave her children the opportunity for education. These children although in their old age, have well-established and financially better-
off households than those of the second wife. The move by the mother detached the children from pastoralism as they opted for other sources of livelihood. The second wife has access to the communal land and pastoralism became their main source of livelihood. Her children are settled in the communal and others relocated to government land and they all practice pastoralism, subsistence agriculture and tourism. A third wife was married and settled in Ngare-Ndare and became an agro-pastoralist. Her children inherited the land in Ngare-Ndare and practice crop production. It is evident that women among the Maasai community facilitated settlement in certain areas as was dictated by husband livestock splitting decision.

A Maasai woman married and living in Il Ngwesi as a pastoralist was brought in as co-wife by the husband. She was so bitter and this brought conflict in the homestead. Traditionally, she had no option of going back to her parents like the Kikuyu wife in the previous scenario, she was relocated to Manyangalo which was considered very far from Leparua. This was the husband’s farm and overtime learnt crop production skill and she is now a farmer. The second wife was settled in Il Ngwesi because of her potential to engage in tourism activities.

The conventional falling in love before marriage was not a consideration before a woman was married. This practice is still upheld. A man expresses his interest to marry and either the family or age mates identify the lady and a team and the groom take the next steps of going to the in-laws. Negotiation takes places at the bride’s home and she is finally instructed to follow the team. She may not be aware of where she is going or who the husband is among the team, she is asked to only follow, walk and not look behind. Those mentally prepared after the long walk would not enter the groom’s compound without being shown her share of livestock. Young women are also married to support the older wife and it is the latter’s responsibility to groom and train her. These two ladies often live in the same compound but in different houses. A father can also identify a wife for the son, who is asked to accompany the father to a certain household. The negotiation takes place, he can see many girls but has no idea of which girl in particular until when the process is finalized and the lady follows. In a discussion with the young men, to challenge this scenario, they choose to marry early, bring the wife home before the fathers takes the action, especially if from a different community.

If a man was interested in pastoralism, his choice of a wife is limited within the Maasai community and rarely other pastoral communities. If a man was interested in crop production, a lady from the
tradiitionally known farming community would be identified, the kikuyu and the Meru. A similar scenario would take place but negotiation would be based on intercultural negotiations, and would be settled in the husband agricultural land.

An elder man who has several wives often neglects the elder wife in preference to the younger wives. The justification is that she already has elder sons who can take care of her. Secondly, the young wives have young children who demand more attention from the husband. The elder lady often focuses on educating her younger son. An interview with an elder Maasai lady mentioned her struggle to educate her son at the university. Over the years, women have embraced the importance of education especially following the introduction of free education. They are the foundation for their children’s education opportunities which defines their future adaptive capacity. They are involved in various income generating activities like bead work, manure sale, hide and skins, and petty shops to raise funds needed.

**Summary:** The low adaptive capacity of the Maasai women is spearheaded by the community itself that have marginalized them. This notwithstanding the capacity of household to engage in adaptation practices is highly influenced by their knowledge, experience and the role they play. In pastoral systems a young woman from the same community is preferred, for crop production, one from a different culture is identified. Elderly women are more independent and play a significant role in educating their children especially the last born who traditionally is expected to take care of the mother. This is associated with the fact that their sons who are often exposed are involved in decision making. Decision making of elder women is easier and faster than young ones and preferable in the uptake of new practices.
Figure 4: Married women attending to their main source of livelihood
4.1.9 Discussion: social differentiation of effects of conservancy establishment

Wealth as an aspect of social differentiation is visible in various forms especially after the relocation to create room for the conservancy. Household ability to migrate was influenced by livestock as a financial resource, social relation as are the custodians of information and availability of land. These aspects are endowed to the household differently and therefore distinguish the adaptive capacity of one household from the other. Settlement brought differentiated wealth in terms of human capacity, financial resources, natural land, social networks and all influence the various adaptation practices that a household can engage in. Households that have managed to acquire various land use practices as sources of livelihood after settlement have been observed to have higher adaptive capacity than those with limited ability to engage in diverse practices.

Gender. Il Ngwesi community is a highly male dominated society with women being marginalized. Observing the role of women was critical in determining adaptive capacity of the household because everything else was male focus. How they access resources and influence decisions. It was observed that their provision of labor, knowledge and experience determined where the household settled. They also determined the opportunities accessible to their children be it education or the practices they engaged in. The young and middle-aged women have limited access to resources and decision making. The older generation of women was considered mature and for this reason neglected by their husbands and left under the care of their sons. Culturally the young son takes care of the mother and the effort to educate this son was observed.

Age as an aspect of social differentiation was classified as three components. The older, middle-aged and youth. The older male generation was observed to be hanging on to traditional pastoralism while the elder women were seen to be engaging in other activities especially with the support of their sons. The middle-aged generation both male and female were observed to be diverse and aggressively engaging in various practices around crop and livestock production. The youth both male and female have varying levels of adaptive capacity depending on where they are geographical located and influence by their parents. In agro-pastoral areas they were observed to be moving out of pastoralism and engaging in off farm activities. In pastoral areas, they were herders, laborers in tourism sector with very minimum access to resources.
4.2 Collective and individual fodder production and management

Pasture production and management in the drylands involves the cultivation of fodder and storing it by making hay bales. It is a new adaptive practice initiated collectively by Il Ngwesi household living in Nandugoro/Lukusero neighborhood where production takes place in the government land in Nandugoro.

4.2.1 Drivers of fodder production and management practice

This initiative was propelled by the prolonged drought that the community has been experiencing over the last decades resulting to lack of pasture and consequently high livestock mortality. This triggered a few residents of Nandugoro village to mobilize the households, uniting as residents and re-arranged themselves as a community group with the objective of producing fodder for their livestock. The idea was based on collective production of fodder in government land, making hay and storing for use only during the drought season. In times of need it would first be used to feed the weak livestock that could not migrate far in search of pasture. Secondly used to supplement livestock during severe drought where they are taken to the field to feed on whatever was naturally available and in the evening they would be given hay.

Fodder production demands have graduated to other levels where households are fencing off land to allow natural regeneration of grass, which is used to serve the same purpose as stated above.

Summary. Climate induced drought is an additional stressor to the already over stretched households of Il Ngwesi group ranch. This has triggered collective as well as individual responses from the community households. Among them is the production of fodder to enhance livestock as their main source of livelihood. Traditionally fodder production and hay making were not in their coping strategy list. Mobility as a pastoralist strategy enhanced natural regeneration of grass. Today the community is re-arranging themselves and learning to produce fodder and hay as a community as well as individuals through Land “privatization”

4.3.2 Households access to prime fodder production land

This practice is observed in private land tenure regime like in Ethi and Chumvi, however these are private land and users and owners dictate the land use practice.
The collective fodder production is based in Nandugoro village giving the residents priority to be members. Individualized grass regeneration is based on private enclosures in government/public land. The fodder generated is privatized and only accessed by the specific household. Ideally other residents are not allowed to freely access the regenerated grass. The acceptability of this “privatization” practice of land in public area was not clearly identified. The reason been, households are ideally allowed to produce crops for their domestic use. They fence off a parcel of land using timber to prevent destruction from elephants. This first step of enclosure keeps off livestock and grass naturally grows with little rainfall. Ploughing is an expensive affair as it requires availability and affordability of tractor services by the households. This would take long, giving more time for the grass to grow. When the land is finally ploughed, the logistic and turning of the tractor in a fenced farm does not allow all parts of the farm to be cultivated. This is not manually done either and is left for natural grass regeneration. This grass is used to feed individual weak livestock.

This practice is observed in private land tenure regime like in Ethi and Chumvi, however these are individualized land and they dictated the land use practice.

Summary: Fodder production as a means of building adaptive capacity of households is based on access to land or institutions on land. Fencing it off as a collective action is an important element for its success although based in government public land. Individual fodder production required private land access and arrangement where fencing is an important element ensure “privatization”.

4.2.3 Ownership of fodder production and management practice

The people involved in this communal project were the initial 50 residents of Nandugoro neighborhood who started the project in 1997. The registration was later opened to all other members of Il Ngwesi group ranch and the membership has now increased to over 200 people. These are members who have paid the registration fee of 15,000Ksh. The project is run by nine committee members. The officers from the Ministry of Agriculture, Livestock and Fishery offer technical support to the members. There are however members of Il Ngwesi who are not involved in this project because one needs to raise 15,000Ksh to join the group as a registered member.
Individual fodder production in Nandugoro neighborhood is very illusive as generally any Il Ngwesi group ranch member can establish a farm in Nandugoro. This means can “privatize” a parcel of land and produce individual fodder.

Summary: To be a project member and to benefit from the adaptation practice, financial resources and social relations are paramount wealth elements. The individual households need to mobilize their own funds to pay the registration fee. They equally need to be members of Il Ngwesi to benefit from the project. These requirements are also needed for a household to fence off private land for individual fodder production. Other key stakeholders are joining in to support what they consider as a successful project initiated by the community.

4.2.4 Development process of fodder production and management practice

The project was initiated in a fenced out 10 acres meadows of Mugogodo forest, a government reserve. This has been expanded to 40 acres in the last five years and there is an ongoing proposal by the National Drought Management Authority (NDMA) to increase this by an additional 80 acres making a total of 120 acres under grass production. Rhodesian type of grass cultivated.

The initiation of this practice was motivated by the exposure visits the leadership of Il Ngwesi had to farms in Kikuyu land, Rwanda and Eritrea. Of the three visits, what was most intriguing was a visit to a kikuyu community in Matanya village in Laikipia County where households have small acres of land and raise dairy cows. To sustain their agribusiness, they individually cultivate fodder, manually harvest it with machetes, hand press and make bales of hay. What was striking was the low levels of resources at the disposal of these households yet effectively managed to sustain their livelihoods. They compared this with the large tracks of land at their disposal that have been left for natural grass regeneration with no human intervention.

In terms of growth, village community group has opened membership to all members of Il Ngwesi. The leadership has been taken up by the Il Ngwesi Community Trust (ICT), an organ of the group ranch that manages on behalf of the project members and the Il Ngwesi community in totality.

Approximately 3000 bales are harvested every season and stored mainly as feed reserve for the members’ livestock during periods of drought. The harvesting process is mechanized where hired
tractors are used for harvesting, raking and baling. The bales are stored in a ventilated facility with a roof to prevent damage from the rains. The entire process including the storage takes place in the field. This way the grass is said to remain in good condition for long. Payment for tractor service can be in kind, where bales of hay are used, especially when the project does not have cash flow.

When a household needs the hay, communication is done to the office and arrangements made to transport the hay to the homestead. This is either through motor bikes, the women carry, or vehicle transport is used if being taken far.

It cannot be assumed that livestock will naturally accept to feed on hay, as the animals are used to grazing. Individual owners entice those livestock to feed on hay by giving those molasses.

The farm is surrounded by wooden fence that is often and frequently destroyed by elephants since the area is a wildlife area. The success of the project depends on the quick response of the community to repair the fence after the destruction. If this is not done, livestock will equally find a prime area to graze and all will be watered down. The material used to fence is timber that comes from the forest. Women are employed to fetch the timber and work on the fence. They are also mandated to repair weak points where livestock can enter.

Planting was done together with wheat which was harvested after the first season and the residues left to decompose and enrich the soil for the growing grass. The income from wheat supported community projects.

**Summary:** The success, growth and out scaling opportunities of the fodder production practices has been highly influenced by non-financial resources like availability and accessibility of government land under the management of the community, fertility of the land that does not require external input, fencing material is freely available in the forest. These are variables that would otherwise be very expensive and out of reach for the community.

Social relations keep the project members committed and accountable to each other. The management by professionals from the larger association offers extension services and linkages to other stakeholders like government who support its expansion.

Household adaptive capacity is based on their ability to meet individual requirements because the livestock are individually owned and their feeding program is based on household decision.
4.2.5 Benefits of the fodder production and management practice

The stored hay is used during periods of drought when there is less pasture. A number of bales are kept aside for members who buy at a subsidized price. The minimum number a household can access is 10 bales and depending on demand and availability these can be increased up to 50. As the market price of hay bales fluctuates often from 250Ksh to 350Ksh, the members get the bale at 150Ksh. The income from this project is ploughed back to buying more seeds, paying laborers, fencing, and expanding the farm. It also goes to funding community work like school projects and health care. It also supports specific members who are undergoing specialized medical attention in hospitals where the bills are said to be high and provide school fees to needy families.

Summary: The community benefits from easy access to the hay, while members get at subsidized prices. Income generated develops the community in general as it is ploughed back to support communal and collective actions. It also gives them a voice as it increases their recognition at county level as they have been identified as a successful adaptation project by NDMA. Individually, households have tangible benefits by being members of the project as it reduces the cost of managing livestock during periods of drought.

4.2.6 Challenges of fodder production and management practice

The project is faced with several challenges. The productivity goes down with time as the traditional grass species regenerates creating competition with the planted species. Timely re-ploughing and replanting is needed. Increasing demand for settlement area reduces possible potential areas for expansion. Prolonged drought reduces productivity of fodder yet its demand increases as livestock is fed more on hay than natural regenerating grass. Households own more livestock than can be maintained effectively on hay alone. Culturally the Maasai keep large herds of livestock and the issue of livestock reduction is usually too sensitive for the leaders to tackle and they have chosen to leave natural course of drought and mortality to prevail. The seeds were purchased from a farm in Tanzania after various failed trials with seeds from two farms in Kenya which did not perform as expected. The seeds were said to germinate sparsely which was not only expensive for the community in terms of finances but also in terms of time and opportunity cost due to rain-fed and season dependency.
Summary: Fodder production as an adaptation practice is faced with a number of challenges and cannot by itself sustain the pastoral sector. The initiative is very good but its sustainability is based on members’ empowerment to engage and make deliberate choices. These are challenges resulting from limited human capacity to engage in a changing world. For example large herds of livestock cannot be adequately sustained on hay alone especially during periods of prolonged drought. Hay is considered a supplement and not for satisfaction. They are let to graze whatever is available and in the evening given the hay. One bale is given to four cattle and for the weak ones that were not taken to graze, one bale is shared between three cattle.

4.2.7 Gender and fodder production and management practice

The fodder production and management project was initiated by men who held influential positions and decision making powers in the village who had travelled for exposure visit. The women are both the primary laborers as well as direct beneficiaries. They repair the fence which is frequently destroyed by elephants and scout the farm to survey areas that need repair. Traditionally when the weak livestock were left at the homestead, the women were expected to graze them near the house base and water them. This increased the women labor which was already over stretched by other household chores. Providing an alternative feed to the weak livestock benefits the woman. Equally fodder availability reduces the duration livestock should be away from the homestead and the woman can milk and get food for her family.

The woman is in-charge of the “privatized” land for food production. She maintains the fence and cultivate the crops and leaves spaces for grass regeneration for the weak livestock.

Summary: Fodder production as an adaptation practice in community projects as well as at household level benefit heavily from women labor. They manage the daily operation of the project making decisions on repairs which is a fundamental activity for the success of the project. There is strong linkage between women and livestock been within the homestead. It can increase work load if she has to feed it but she is equally assured of milking the lactating animals if they have not migrated, improving the food security of the household.
4.2.8 Age and fodder production and management practice

Majority of project members are male of the age bracket 40-60 years. The male of older generation with large herds of livestock were initially reluctant to join the group claiming that the pasture was enough and the livestock would migrate. A male participant who was 85 years old, physically very strong, followed his livestock by foot wherever they went. He would transect many regions, covering many kilometers and would visit his homesteads in different villages by foot. The sons complained of this but they would not do much to stop him. He prepared his body by eating fatty meat of sheep which would give him warmth to sustain cold weather of areas like Mt Kenya where livestock migrated during periods of drought.

Limited access to pasture land and its increasing challenges is still not a reality to men of older generation. As drought prolongs and becomes more severe they experience more loss of livestock than those who have few and this is expected to be an eye opener. They do not only loss livestock from drought but they are also clear targets of cattle rustlers who target homesteads with large herds. One elder man explained how he was following his 200 herd of livestock that had been stolen by neighboring community and had recovered some after long informal negotiations. Some elder generation men have over time joined in as members of the fodder production project.

Summary: The capacity of the household head to engage in adaptation practices is greatly influenced by age and exposure.

The older male generation of 70 years and above within the Maasai community was observed to have difficulties in adapting new practices and innovations. This decreased their adaptive capacity to climate shocks like drought and are equally easy targets for cattle raiding leaving them worse off. They are not armed, their livestock is sometimes divided and placed in many locations depending on the number of wives and he is only physical present in one homestead at a time, risking the lives of the rest of the family members especially the wife.

The middle-aged household heads are exposed, they are often the team that takes leadership positions in the group ranch and enjoy exchange visits and education tours organized by the ranch. They may not be educated but have capacity and financial resources to make decisions not only at household level but at the community level as well. They are the team that spear headed the hay project.
The direct and active participation of the young generation the project was not observed. This notwithstanding, they play a key role in transporting the bales where needed using their motor vehicle as a business venture.

### 4.2.9 Social differentiation: fodder production and management practice

**Wealth.** The success of the community-led fodder production is arched on the committed social relationships that started at the village level and cascaded upwards attracting the bigger community network, the management of the group ranch and finally the national government. This is an indication of commitment and supportive social networks and relations. Strong social resources contribute significantly to the success of fodder production and hay making adaptation practice.

The availability of fertile land as a natural resource made the project implementation successful for lack of many costly external inputs like land and artificial fertilizer. It equally made the debates on expansion and upscaling easier. Lack of financial cost or implication attached to the utilization of the land by the community is a big milestone for the community producing fodder. Lack of the initial capital to purchase land would be evidenced in other neighborhoods with private land systems. Their own internal challenges that would hinder expansion are therefore issues like increase in population, settlement and other land use plans.

**Household financial resource plays a key role in the entire project of fodder production and as an adaptation practice.** The initial capital was sourced from members’ registration fee. To benefit, the households need to buy it and sometimes buy additional supplement to entice the livestock. To work on “privatized” plots family labor and resources are needed.

**Gender:** The membership and leadership of the fodder production and management as an adaptation practice is based on male positions of power. They play an instrumental role in initiating the project and they make decision on its implementation. Females play a key role as primary laborers. They equally benefit as the workload of feeding the weak livestock left at home is reduced. They do not own land and have no authority over it but can access and utilize what is around her homestead for crop production.

Gender as an aspect of social differentiation distinguishes the role of men and women. Men are the strategic thinkers while the women are the implementers.
Age as a social differentiation aspect is observed within the different age groups as an intersectionality of attitude, exposure and decision making powers. In this practice middle-aged men are observed to take the key role, as the older generation are reluctant and the young generation missing in action.

Figure 5: “Privatized” grass regeneration farm (top) and fodder production farm (below)
Figure 6: Hay storage (top) and mechanized hay making (bottom)
4.3 Community rotational grazing units as adaptation practice

This pasture management takes place inside the group ranch. The group ranch is divided into three main areas: The core area where the eco-lodge is located has a 5km radius, the conservation area where grazing is only allowed when the management assess the drought situation and opens the grazing units for the members to graze their livestock. Finally, the settlement area where the members reside and plan their own grazing schedule.

The main aim of this management practice is to ensure members of Il Ngwesi group ranch have pasture all year round and the ecological system is able to utilize the little amount of rainfall effectively as well as reduce grazing pressure on the land, reclaim the degraded land and wildlife is sustainably maintained in the land. The conservation and core area are under management of Il Ngwesi ICT and the settlement grazing area is managed by the neighborhood grazing committee team.

4.3.1 Drivers of rotational grazing as adaptation practice

This adaptation practice was triggered by the collective decision made by the community to convert their land into a wildlife conservancy. This reduced the land accessible for livestock grazing. Proper management was therefore needed to ensure members have pasture to graze their livestock. Secondly wildlife conservation is the core business and to maintain them in the land, availability of pasture is paramount, otherwise they would migrate to areas with fodder. Livestock for this reason are prohibited from grazing at the core area. The available pasture is purely left for wildlife. At the conservancy area, wildlife can freely access at will, however livestock are not allowed until officially opened and only on specific grazing units as planned by the management. This is only when drought persists. Complete grazing is not allowed. 50% of the pasture is left for wildlife and homestead are asked to find alternative pasture if the blocks are exhausted.

Summary: The management using rotational grazing efficiently allows utilization of available natural resources both for livestock and wildlife conservation. It also ensures that fragile land is maintained under cover and degraded land reclaimed. Although economic benefit from wild life conservation and tourism is the main driver of rotational grazing, community social relations are still upheld by ensuring household livestock have pasture. All these happens in the communal owned natural resource, the land.
4.3.2 Households access to settlement grazing land

People involved. The settlement grazing area operates in three neighborhoods: Lower Il Ngwesi where the conservation area is situated, Upper Il Ngwesi where Upper Sanga and Lower Sanga villages are based and finally Nandugoro/Lukusero neighborhood.

People left out. The other five neighborhoods: Ngare-Ndare, Ethi, Chumvi, Leparua and Ngare-Sirikon are left out of this practice and management plans. They are however free to access the pasture in the neighborhoods. They are referred to “as people from the diaspora” by those who are inside the conservancy. The challenge as was explained is that when the neighborhood grazing blocks have pasture, the “diaspora” people come with their livestock creating pressure on the residing community. This is considered a “soft” problem because they are equally members of the group ranch and adhere to the set rules. The bigger challenge is the members of neighboring Samburu community. They graze by force and do not adhere to the rules and these brings conflict and fights. This is referred to as a “hard” problem as they demolish the achievement attained by the practice. They not only forcefully graze, but they also steal livestock. In 2015, September to December the Samburu community are reported to have stolen over 2000 goats and sheep from Nandugoro. The women are not members of any grazing committees.

Summary: Rotational grazing has significant benefits to those who are members and adhere to the set rules. The available pasture however brings negative externalities to the community, competition and insecurity for the naturally available resources.

4.3.3 Process of developing rotational grazing units as adaptation practice

Process: The three neighborhoods experience different climatic conditions Nandugoro and Upper Sanga being in the highlands while lower Sanga and lower Il Ngwesi being on the lowlands. The practices engaged in the management of these grazing zones are different. In the highlands, practices to preserve the grass and tree species are used, such as elimination of invasive species and cutting down of poisonous trees and community participation in grazing plans. In the lowlands, bare land is reclaimed through livestock management. Other practices include animal bunching and letting them graze to break the hard pans using their hooves. These reduces rain water runoff and increased water percolation into the land. Animal boma (shelter) are built in degraded land
spots and livestock spend 7-10 nights there. This breaks the hard pan and allows seeds dispersal through animal waste and grass regeneration on a rainy season.

The neighborhood grazing committees and the community members are trained to conserve their grazing zone by the ICT professionals. They are shown where to graze especially during the two main seasons, the wet and dry periods.

The conservation area is managed by the ICT and they have established rules. Some of the rules are: no guns in the conservation area, only rangers and licensed home guns are allowed. Respect for wild animals is emphasized, killing of wildlife is a crime, even when it has attacked livestock. Conservation rules apply like: passing through at ones risk. Grazing blocks are developed through participatory maps. There are 5 grazing blocks which are reserved for dry season grazing often opened in the months of June to November.

The conservation area is opened after various considerations to allow equitable distribution and effective management of available pasture. Firstly, all settlement grazing committees have exhausted their allocated area and are all requesting for the opening of the conservation area. A request by one group cannot be allowed and is considered as inefficient grazing. There is usually no limited number of livestock a household can bring. The main consideration is the total number of livestock in a unit and the duration they can sustainably graze in one unit. Members are encouraged to graze 50% and they move out leaving the rest to the wildlife and for the land cover. These rules are enforced first by giving a warning, secondly using fines where 500Ksh is charged per herd for non-compliance. A repeat attracts a third level fine where a sheep and at times a cow is demanded by the elders. Non-compliance can result to one being chased away completely from the grazing region.

The settlement grazing zones in the three neighborhoods are managed by the village grazing committees. Members know each other and often are few family members. Other members of Il Ngwesi not settled in these neighborhoods can take their livestock to graze in the area. For example a household in Ngare-Ndare can migrate livestock to Nandugoro.

**Summary:** The development and the success of the community rotational grazing is dependent on social relations and commitment of Il Ngwesi group ranch members. At settlement grazing levels where neighborhoods manage their own grazing plan, the social network is strong and rules are
obeyed. However, they often receive livestock from other members who are not residents, those who are members of Il Ngwesi, referred to as “people from diaspora”, they are said to follow the set rule. Neighboring communities like Samburu also come to the area in search of pasture. They are said to be violent, do not follow set rules and bring insecurity. This kills the motivation of the residents to set their rules and to adhere to them.

The difference between core area and conservancy area is quite observed through the natural vegetation available. The togetherness of Maasai community of Il Ngwesi group ranch motivates them to obey the set grazing rules as well as the conservancy rules that promotes grass regeneration. This is enhanced through professional management by ICT as well as AGM where members air their views and realize the benefits of the conservancy. The area is however guarded by armed conservancy ranches. Drought and insecurity often waters down the achievement by this practice, rendering rotational grazing efforts ineffective.

4.3.4 Benefits of rotational grazing units

In the conservation area, degraded land is reclaimed, increasing the pasture productivity of the communal land. Livestock activities improve the soil fertility through their manure waste improving the soil’s water holding capacity.

Rotational grazing has greatly improved the natural resources in terms of available pasture in Il Ngwesi group ranch. This is both at the three neighborhoods as well as at the conservancy level. Based on the estimated carrying capacity of the land, the grazing manager expressed having enough pasture for the members throughout the year.

The community at large and households participating in rotational grazing have greatly improved their knowledge on conservation and need for planned grazing. This is because they participate and are trained on planning and managing their grasslands and they equally see the results of the practice. Other than the challenge of intruders, one elder from Nandugoro expressed that they did not need to travel to Mt. Kenya for pasture like they traditionally did during periods of drought. Another one was optimistic that the process over a period would bring the dried spring back and the grazing manager was optimistic that the future was bright.

Rich and healthy livestock related diet is easily available to the participating neighborhoods. Women from Ethi and Chumvi, complained of changing diet for lack of milk because their
livestock would be away for many months. The women from the three participating neighborhoods live with their livestock. They milk them every morning and evening. Milk forms a high percentage of their diet, improving the quality of household lives, including the children and women.

Grazing takes place within or near proximity of the households. It leaves household members with ample time to effectively manage their other chores and women for example engage in bead work and other activities like house constructions and decorations.

**Summary:** The benefits of rotation grazing to the participating communities is observed and expressed. It improves the ecological ecosystem and productivity of the land. It forms part of the food security of households in the area and improves the social relation, knowledge and commitment of the members.

### 4.3.5 Gender and rotational grazing adaptation practice

In all pastoralist societies as was expressed by the grazing manager, women are not considered in pasture issues. The herders are often men, “morans” (youth male) and young boys. The women are indirectly involved because they are the ones who count the livestock when they come back from the grazing field to ensure they are all back safely from their grazing place. They milk all lactating animals and they get to identify and know when one of them is sick. When the grass within the settlement area is not well managed, livestock move with herders very far and often do not come back in the evening. In this situation, the milk was said to belong to the herders and the women have no milk for their families. This is in form of morning breakfast as well as main accompaniment to the staple food, *ugali*. This outcry was equally expressed by women in Chumvi neighborhoods who due to prolonged period of staying without their animals, they had changed their main diet from livestock related products to crop based products. This is not because they can produce but because they can access from the market and store. Rotational grazing was expressed as a good grass management practice by the women because they can live with their livestock and benefit from livestock products. In this era of insecurity, they expressed being able to unite with their families (husband and sons) every evening. Finally, it minimizes the task the women are given to manage the weak livestock left in the homestead.

In Il Ngwesi group ranch rotational grazing is under ICT and at this level women have positions and can influence decision making at this management level, however, direct influence or
participation was not observed. At the village or conservation grazing committee, women have no positions even to participate.

In Lokusero village, many female headed households were observed. These women have goats and sheep and although do not attend the meeting, they are not limited or denied access to pasture land.

**Summary:** The role of men and women in rotational grazing at household level is very explicit. The men manage the natural resources while the women benefit from the results. Women access the natural resources freely although not actively involved in its management and their absence is due to their low positions within the society. Women due to their non-involvement in nature conservation do not benefit from the training offered by the ICT management and therefore do not access information given to determine grazing schedules.

### 4.3.6 Age and rotational grazing adaptation practice

Traditionally the Maasai were well known as warriors, physically guarding their society, the pasture and land. This was a function of the young men. They protected their people, the land and the livestock against other competing tribes and against any other danger like wild animals. Today with rotational grazing, Il Ngwesi finds itself with enough pasture to satisfy its members’ livestock. This however attracts armed neighboring community especially the young generation. The people who fight back are not the traditional warriors. Although they still herd and protect their livestock from wild animals, their role of protecting the land has diminished because many of them have gone to school, migrated and gone into formal employment. Middle aged men, a few young men, and the herders join hands with trained rangers to form the team fighting back. This is how Wachira the research assistant was shot.

The young generation in the community has brought conflicting dynamics on rotational grazing. They can theoretically settle with their families wherever they want in the communal land, however the grazing practice demands settlement in specific areas and leaving the rest for pasture regeneration and expansion. To effectively manage rotational grazing practice they are not allowed to just settle anywhere. However social institutions are getting weaker to enforce this rule. The worry is that when one is allowed, many others would follow, straining the management practice engaged to ensure sustainable grazing plans.
Summary: Grass management practices in drylands is a fundamental principle in building the adaptive capacity of the community and the residing households. This tradition was however upheld by informal social institutions, which are breaking down. Traditionally, the Maasai youth protected their land and their livestock, today with education, they are in schools, employment and business. They are not attached to the livestock of their fathers.

The traditional cattle rustling was based on more or less similar fighting apparatus, the bow and the arrow and the Maasai warriors were feared for their expertise. Today the warriors from the neighboring community are armed with guns and so the Maasai young men fear for their lives and refrain from fighting.

Traditional negotiation and respect for the elders was upheld, breaking grazing rules would amount to fines and this was enforceable. Today any enforcement can only be through the government structure, the chief and the effectiveness of this is very low for lack of enforcement powers.

4.3.7 Discussion: Social differentiation rotation grazing adaptation practice

Wealth: The management of group ranch and natural ecosystems using rotational grazing allows efficient utilization of available natural resources both for livestock and wildlife conservation. This requires a wealth of knowledge and participation of the community in general. The governance structure as well as the beneficiary need to understand the various actions and practices being engaged to sustainably benefit from the ecosystem. It needs to be a people centered management system. The benefits accrued to the households lead to more commitment and adherence of the set rules.

The social relations in rotational grazing practice in a communal land is essential. The social institutions that tied the community together needs to be revised and empowered. Lack of these institutions leads to lawlessness and ignorance to the set rules which can consequently result to a collapse of the practice.

The economic benefits from wildlife conservation and tourism needs to be felt at the household level. This authenticates the 50% grazing on the conservation area and leaving the rest for wildlife.

Availability of pasture in the drylands in communal lands brings conflict and social pressure in the residing households. This explains why the residents are not necessarily excited with having too
much pasture. They lack land ownership and legal backing to keep off non-participating members and other communities. The land they use is communal for the case of lower Il Ngwesi group ranch and Government land for the case of Nandugoro residents. Their strategy is to have just enough forage that can sustain their stocking rates, to keep off interested parties and keep their households at peace.

**Gender:** Rotational grazing has brought a wealth of knowledge and benefits to the participating households. The male members participate and set up rules that are followed by everyone inclusive of the women. The women may not have any role in the management of the practice but they are the main beneficiary because their family network is left uninterrupted by migration and they easily access livestock products for their diet. There is minimum decision making done on the implementation of this practice by the women.

**Age:** Planned grazing is a traditional practice that was established with the formation of the group ranch. The old generation at the time wanted to be sure they can sustain their huge herds of livestock with the available pasture. This practice has been picked up by the middle-aged men and has gone through transition and modification to include elements of land reclamation, facilitating grass regeneration and elimination of evasive species. A lot of training and skills are being acquired to manage the pasture land. The young generation have different motivations and would require clear rules and regulations to keep the social institutions relevant.

*Figure 7: Guinea fowls in the conservation area*
Figure 8: Il Ngwesi group ranch: core area (top) livestock not allowed, conservation areas (bottom) livestock allowed during drought
5.0 Discussion, Conclusion and Recommendation

5.1 Discussion
This report has brought out detailed evidence of how adaptive capacity is not evenly distributed across households of the Il Ngwesi Conservancy. Instead, the intersecting factors of wealth, gender and age play important roles in shaping the kind of adaptive practices accessible to people in various social positions.

Wealth

Wealth as an element of social differentiation and adaptive capacity has been viewed in three main dimensions: material resources; supportive social relations and access to natural resources, (financial, social and natural capital)

Access to material wealth is an important component in determining adaptive capacity of households. It defines the land tenure regime a household can settle in and the land resources they can deploy. In the drylands of Kenya and within the Il Ngwesi Maasai, the availability and accessibility of land is an important consideration in engaging in any adaptation practice and consequently determines the adaptive capacity. This is especially so in a community in transition, a process where individualized household actions count in determining practices to engage in. A few decades ago financially wealthy male-headed households, with livestock could acquire prime land and their family benefits to date. These households are better-off than other households in the community. In this study they are referred to as households with high adaptive capacity. The study shows that these households were equally early adopters of relocation and settlement practice. This way they acquired and settled in prime lands. These are areas and spaces where both livestock crop production practices are possible. The cost of land and settlement was much easier then, than it is today because large livestock herds would be converted to finances and used to purchase land. This has been instrumental in building the adaptive capacity of the households and family lineage and therefore high income households that tap from both crop and livestock, making agro-pastoralists better off in terms on handling impacts of climate change. Today, with the changing climatic conditions, the impacts have resulted to reduced herds of livestock, which cannot significantly contribute toward purchase of land, the prices of which have equally gone up and with limited availability. Households therefore with limited number of livestock are considered to have low adaptive capacity.
Supportive social institutions in the drylands either in form of formal or informal institutions are important pillars in building the adaptive capacity of the households and the community in general. Il Ngwesi Conservancy as a formal institution was triggered by changing climatic conditions and responded by taking wildlife conservation and tourism as an alternative source of livelihood, a practice that has been instrumental in developing the area and the members. The income was recorded to fund communal facilities like schools, roads, health facilities, grass management roles that would ordinarily have been the role of the government. The fund also supports specific individual needs like school bursary and medical bills. Community groups, relatives, friends and being members of the same neighborhood builds the social bonds and ties that are needed in developing adaptation practices and therefore the adaptive capacity of households. A member of the fodder group, for example, benefits from subsidized price of hay. The access to prime agricultural land was often based on friendship networks and rotational grazing as collective action is intended to benefit ranch members only.

Households with strong and supportive social connections are evidenced in this study to have better adaptive capacity and are referred to as households with high adaptive capacity. They are both group ranch members but have other memberships at various levels in groups around an adaptation practice. Those who are only members of Il Ngwesi were observed to have a low adaptive capacity with limited social connections.

Natural resources and adaptive capacity are closely linked as availability and accessibility of ecosystem services (land, forest, water, and wildlife) determines the livelihood options households can engage in. This is because the Il Ngwesi community is highly dependent on the natural resources and consequently their adaptive capacity. Agro-pastoralism, for instance, is possible with access to usable agriculture land with water and pasture land for livestock, i.e. proximity to forest. Households practicing agro-pastoralism with irrigated water are said to be better off, with higher adaptive capacity, than those dependent on rain-fed farming.

Traditional pastoralism on the other hand is based on large tracts of pasture land, available only in communal and government land. Households in communal land are heavily dependent on natural resources specifically rain fed and natural grass regeneration practices that are climate dependent, hence have a general low adaptive capacity with high financial wealth. They have large numbers
of livestock and can access natural assets in terms of pasture land, however have low social connections, low physical assets like irrigation facilities and low human capital.

Their level of operation is however still small scale with limited capital base. For example, one motor bike as a form of physical asset with basic education. This study identifies adaptive capacity as process that grows over time. The youths although not financially wealthy, they are in a process of building their adaptive capacity based on climate independent enterprises.

Off-farm activities like tourism are pegged on wildlife and nature conservation in the communal land. Other activities include business and employment. Households of young people are embracing these options and learning on the job. Their level of business operation is however small scale with limited capital base, such as one motor bike as a form of physical asset. This study identifies adaptive capacity as process that grows over time. The youths although not financially wealthy, they are in a process of building their adaptive capacity based on climate independent enterprises.

Female headed households in general have limited access to livestock and land. There are also male headed households who purely relied on pastoralism and lost their livestock from drought or insecurity. These categories of households have limited social networks and material wealth to engage in adaptation practices. This category was observed to have a low adaptive capacity and low income.
### Table 2: Social differentiation and adaptive capacity of Il Ngwesi households

<table>
<thead>
<tr>
<th>Wealth High (material, social, human, physical &amp; natural)</th>
<th>Low Adaptive Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agro-pastoralist households</strong></td>
<td></td>
</tr>
<tr>
<td>Rain-fed crop production</td>
<td>Low income households</td>
</tr>
<tr>
<td>Subsistence farming</td>
<td>Non-farm and non-livestock enterprise</td>
</tr>
<tr>
<td>Large herds of livestock</td>
<td>Laborers (herders, farm causals)</td>
</tr>
<tr>
<td>Communal and government land tenure regime</td>
<td>Petty business: house shops, charcoal burning</td>
</tr>
<tr>
<td>Low social networks</td>
<td>Youth and female headed households</td>
</tr>
<tr>
<td>Low and limited exposure facilities</td>
<td>Limited access to property and decision making</td>
</tr>
<tr>
<td>Old men &gt;70 years</td>
<td>Low adaptive capacity and low income households</td>
</tr>
<tr>
<td><strong>Low adaptive capacity households with relatively high financial wealth</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wealth low (material; social, human, physical &amp; natural)</th>
<th>High Adaptive Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diversifying households</strong></td>
<td>Low income households</td>
</tr>
<tr>
<td>Non-farm non-livestock enterprise</td>
<td>Non-farm and non-livestock enterprise</td>
</tr>
<tr>
<td>Nature dependent – tourism</td>
<td>Laborers (herders, farm causals)</td>
</tr>
<tr>
<td>Education, employment and business</td>
<td>Petty business: house shops, charcoal burning</td>
</tr>
<tr>
<td>Empowered youth</td>
<td>Youth and female headed households</td>
</tr>
<tr>
<td><strong>Medium adaptive capacity</strong></td>
<td>Limited access to property and decision making</td>
</tr>
</tbody>
</table>

| **High Adaptive capacity households**                     |                       |
| Medium aged men and women (40-69 years)                  |                       |
| High exposure                                            |                        |
| Fattening and commercialization of livestock             |                       |
| Breed improvement                                        |                        |
| Polygamous /employ herders                                |                        |
| Private land tenure or “privatized spaces”               |                        |
| Sedentary pastoralism                                    |                        |
| Medium or small livestock herds                          |                        |
| Irrigated crop production                                |                        |
| Commercial horticulture production                       |                        |
| High exposure                                            |                        |
| **Low adaptive capacity households**                     |                        |
Age

Age as an element of social differentiation and adaptive capacity in the dryland communities has been viewed in three main dimensions: intergeneration transmission, knowledge and information and transition process.

Intergeneration transmission is observed within the various age groups and particularly the flow of practice from one generation to another. The elder generation above the age of 70 are into traditional pastoralism. Mobility having been one skill that they learnt from their parents, this age group was observed to have settled in communal and in government lands where large tracks of land are available to facilitate this copying strategy. The uptake of new practices like the conservancy leaves the elder members as custodians of the land but not actively engaged in the operation and decision making.

They are the face of gradual transition from pastoral to agro-pastoral systems. This scenario starting with establishment of the conservancy; relocation and settlement and cultivation of crops as an alternative means of livelihood to complement livestock.

The middle-aged men among the Il Ngwesi community are decision makers and implement new ideas and practices at community and household level. They are the face of the gradual transition from pastoral to agro-pastoral systems. This started with the establishment of the Il Ngwesi conservancy, resulting to relocation of members and sedentarization which came with more individualized actions like crop production as an alternative source of livelihood to complement livestock pastoralism.

The youth below the age of 30 are highly dependent on the parents and where they are geographical positioned. Those in pastoral areas tend have limited opportunities while those in agro-pastoral systems tend to be exposed to various other opportunities including education and agri-business.

Knowledge and information defines the capacity of the household head to engage in adaptation practices. The Il Ngwesi middle-aged men may not have a high formal education, but have attained basic formal and informal education. This added to the exposure visits, the leadership positions they hold and interactions with other cultures gives them the capacity to actively participate in adaptation practices where they take leadership positions in both communal adaptation practices as well as at individual actions. Households with exposed members have a positive attitude and
behavior towards uptake of new practices, for instance the case of fodder production either through collective or “privatization” actions.

The older members of the community; elder men are reactive when it comes to engaging in community and household new adaptation practices like fodder production and management practice. They over rely on their gained knowledge on climate variability coping strategies with less information on impacts of a changing world and this influences their attitude to engage in adaptation practices. Limited availability of skills and their negative attitude to new practices makes them too heavily dependent on livestock pastoral systems reducing their adaptive capacity.

The youth were observed to be the source of information flow that helped household members to take up new adaptive practices. These were particularly the young men that moved out of their settlement areas to search for education like at the university, employment and business opportunities. Youth from regions where agro-pastoralism was practiced had better access to information, education and knowledge that built their adaptive capacity in comparison to the youth from pastoral regions who had limited access to social and education facilities that would improve their adaptive capacity.

Transition process among the Il Ngwesi was observed from pastoralism to agro-pastoralism and diversification to non-farming practices. This is viewed as an attempt by the various households to be more adaptive to future climatic changes. Age plays a critical role in this transition process as community transits from collective to individual household actions. The collectivity is still the mindset of the older generation while the middle-aged are the face of transition. The youth are not actively engaged in decision making at a collective level. They tend to act individually and build their adaptive capacity based on household capacities.

**Gender**

Gender as an element of social differentiation analyses the positions of men and women as factors that determine adaptive capacity of households in the drylands. The findings are presented in view of gender roles, access to resources and power to make decisions.
Gender roles in uptake of new practices in the drylands is an important social differentiation tool as men and women take up distinguished roles. In livestock related practices the men are the main decision makers. The women implement these decisions in form of labor provision like in the case of fodder production practice where the men are the registered members of the project. In rotational grazing women are not involved.

Traditional livestock splitting was a coping strategy to climate variability and risk management of large herds. A new settlement had to be established and often this meant a new wife. Where she was settled defined her household adaptive capacity based on resources available and accessible. Married women played a significant role in determining the adaptive path their children took, be it education, agro-pastoralism or pastoralism.

The role of women was equally determined by the needs of the man. She would be married to support in the farm, in livestock or support the elder lady. This defines the lady’s capacity in the household over time. The first lady is better off than the younger lady. The lady engaged in cultivation is better off than the two.

Women were equally observed to be moving towards business ventures like beads, petty shops and manure and hides and skin where the influence of men is minimum. Households with women who had this kind of side ventures to earn income were observed to be more adaptive than those who purely depended on spouse to provide.

Ownership and access to resources in the drylands of Kenya are not equal terms. Generally, the community has access to natural resources which they depend on for their livelihood like the government land but do not have ownership of the land. This generally limited their land use and investment decision. In Leparua for example, households are limited in what they can do with the land for lack of clear land ownership. Households with both ownership and access to land were seen to have higher capacity to adapt than those with either of the resources due to the ability to make decisions and control around it. A member of the ranch for example considers himself as a communal owner of the land but cannot make land use decisions that directly affect his household adaptive capacity.

Women can access private, communal and government land depending on where they are settled but the men own the land either formally or through the informal institutions “privatization”. Men
therefore have control over these resources and the women utilize the ecosystem services availed to achieve the household food security like subsistence farming, firewood and water. The men equally own the livestock herd which the women can access the products like milk but have no ownership rights and therefore cannot make selling decisions in case of need.

The woman can identify herself with a particular herd especially in livestock splitting. She can again access the products but the ownership and decision relating to these livestock remains the man’s responsibility. Generally the adaptive capacity of the women is based on access to resources and not ownership of the same.

In general power to make decisions is in the hands of the men. The authority of women especially over livestock and commercial farming is very low. The women for example must have to seek permission from their husband to sell live animals.

Elder women although not educated have more independence in decision making and are heavily facilitated and supported by their younger sons, who would be educated, in employment or in business. A household with an empowered youth and older women was observed to make a progressive team in adapting to climate change.

Young women are married to older men to support the older lady in managing the livestock. It is the responsibility of the older lady to build the adaptive capacity of the younger wife and her family. The young lady has no authority and no-decision making powers especially if in the same homestead with the elder lady.

The women in the Maasai community although sidelined by culture, not empowered and not in the front line of adaptation practices, their behind-the-scene roles have been instrumental in the success of the same. In the drylands of Kenya, although both men and women are marginalized with low adaptive capacity, the power imbalances in terms of roles, ownership and decision making makes the women less adaptive to the climatic changes than the men at both levels: household and community level.

5.2 Conclusion
The study gives evidence of how social differentiation influences adaptive capacity of a pastoral community in Il Ngwesi group ranch, Laikipia County. The purpose of the research study was to undertake an assessment of how adaptive capacity is socially differentiated. This is pegged on
ability of households to engage in adaptation practices perceived to reduce the impact of climate change in the dryland. The ability is based on the availability and accessibility of wealth in terms of financial, social, human, physical and natural, as well as age and gender consideration. The adaptive capacity of the household has therefore been conceptualized to be influenced by social differentiation elements like wealth, age and gender.

Wealth in terms of financial and livestock ownership and access to natural resource does not by itself build the adaptive capacity of pastoral households in the drylands. It demands a combination with households’ ability to socially network, embrace new practices and availability of physical assets like irrigation and market. Households that depend on traditional pastoralism may have financial assets in form of livestock, but have low exposure, low social networks, no irrigation facilities and no market for their huge herds of livestock. In drought scenarios, the households suffer huge losses due to high mortality and lack of a market and information to sell before the tragedy. This renders the pastoral households with low adaptive capacity to the impacts of climate change and drought compared to those that are agro-pastoralist depending on irrigation.

The agro-pastoralist households benefits from both livestock systems and irrigated crop and this multiple sources builds their adaptive capacity higher than the rest of the community members. This positive scenario is created by an intersectionality of variable composed of households’ wealth elements like: committed and supportive social relations, available and accessible natural resources, financial capacity in terms of vibrant livestock industry, physical facilities like irrigation and marketing, and human empowerment.

Age as an element of social differentiation indicates that the elder men have low adaptive capacity due to lack of modern exposure and information and their social networks are based on traditional framework of mobility. They have access to natural resources and livestock but this is not adequate to engage in adaptation practices. Middle aged men are better placed and have the capacity to engage in new practices that build their adaptive capacity. Empowered youth can diversify to non-climate and drought related enterprises although with limited financial capacity and limited exposure, they have what it takes to build their adaptive capacity.

Gender bias identified the elder men, pastoralist youth and women in general as having low adaptive capacity due to their limited access to resources like prime land, exposure and finances
to take up adaptation practices. Elder women and empowered youth are seen to be moving towards improving their adaptive capacity because they engage in non-climate related activities.

The social economic and institutional dynamics in the drylands may reinforce or reduce the adaptive capacity and social differentiation of pastoral and agro-pastoral households. The concepts of collective and individual actions in adaptation science in reference to drylands is intimately connected and relevant. This is because adaptive capacity of a dryland community is well arched on both individualized and collective responses. Individual response through irrigation and crop production, diversification into non-farm enterprises which are household efforts that are dictated by their financial, human, social and natural resources. Collective responses through modern livestock production, improved breeds, fodder and pasture production and management and livestock market. This is an orientation towards collectivity, an attempt by the Maasai community to re-aggregate themselves to get back to the former collective actions that had gone down after the establishment of the conservancy and the changing land tenure regimes.

5.3 Recommendation
There is need to appreciate that adaptive capacity in the drylands is socially differentiated and households are not coherent units for either research or development interventions.

To build the adaptive capacity of households in the drylands of Kenya, there is need to combine both collective and individual household actions. Collective in relation to physical assets like market and irrigation, and the general utilization of natural assets like communal land and individual in relation to human capacity building and social networking.

The effects of land “privatization” of communal and government land on social differentiation and adaptive capacity need to be investigated further.
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PICTORAL PRESENTATION OF THE AUTHOR’S FIELD EXPERIENCE

Figure 9: movement experiences and encounters with wild animals
Figure 10: Informal interactions with women group and with pupils
Figure 11: Harsh terrain and poor road networks
Figure 12: Natural demands: doing the unexpected
Figure 13: hide outs and private boundaries; home away from home
Figure 14: Il Ngwesi Eco lodge: the unexpected in the drylands of Laikipia