Draft for internal use – Do not circulate

The Institutional Canopy of Conservation: Governance and Environmentality in East Africa (I-CAN)

McGill University – African Conservation Center

Research Scoping Report #6

Land Booking, Land Demarcation, and the Transition to Agro-Pastoralism in Naroosura Group Ranch, Narok County, Kenya

Jacques Pollini[€], Samson Ole Silantoi[¥,]

[€]McGill University, [¥]South Rift Association of Land Owners (SORALO)

June 2017

I-CAN
INSTITUTIONAL CANOPY OF CONSERVATION

McGill

SORALO
South Rift Association of Land Owners

Cover Picture: Agro-pastoralist landscape in Oloirwua. The fields in the foreground are irrigated and intensively cultivated. The hill in the background is partly cultivated, however farming here requires more investment because water needs to be pumped from the canals or streams below. In the case of new market opportunities, it is likely that farms will expand and intensify in the hilly areas.

Table of content

Acknowledgements

We thank first of all, the people we interviewed in Naroosura Group Ranch, from the Group Ranch leaders to the Locations Chiefs, assistant Chiefs, and men and women we met in villages. They all accepted interviews that sometimes lasted from one or two hours, invited us for tea, and took us to their fields and their *boma*. Many thanks also to James Oleserian Koirag, a great field assistant, translator, and friend, for his patience and efforts. Translation is probably the most demanding work in the conduct of such studies and he always did a great job. Thanks also to the colleagues of SORALO, the African Conservation Center (ACC), and McGill University, especially John Kamanga and Peter Tyrrell from SORALO, Jacque Macharia from ACC, and John Galaty at McGill, for their support, encouragement and feedback throughout this work.

Summary

The Naroosura Group Ranch in Narok County, South-West Kenya, is engaged in a process whereby each Group Ranch member will be allocated individual property rights to a particular piece of land to which he or she will receive a land title. This land subdivision has already been conducted in neighbouring Group Ranches such as Maji Moto (see Research Scoping Report #3). Subdivision and privatisation are regarded by many as inescapable in the context of growing populations and diversification of livelihood strategies. However, they also cause problems such as decreased livestock mobility, barriers to wildlife migration, settlement displacement, and land appropriation by outsiders.

The South Rift Association of Land Owners (SORALO) provides technical and financial support to the Naroosura Group Ranch to develop a land-use plan aimed at avoiding the mistakes made by other Group Ranches during the subdivision process. This land-use plan will help identifying the areas of land that need to remain public or communal, and will determine the most appropriate land uses and forms of tenure based on ecological and socio-economic variables. This report, in addition to providing baseline information about local livelihood strategies and challenges, is a contribution to developing this land-use plan. Based on ten days of semi-structured interviews conducted by the authors in November-December 2016, it identifies the main challenges that Naroosura will face during the subdivision process and proposes several strategies to overcome these pitfalls.

The first challenge is the conciliation of farming, pastoralism, and conservation in the context of a rapidly growing population. Rangeland managers know well that livestock and wildlife can be managed together on the same land, as illustrated by the cohabitation of Maasai herders with wildlife for centuries. Although it is difficult or impossible to determine what population density of humans and livestock is ecologically and socially sustainable under the current pastoral system, it is clear that this threshold has been exceeded in Naroosura. The population is increasingly relying on the combination of pastoralism with farming rather than on livestock husbandry alone. This transformation, which began around 50 years ago with the development of irrigated farming around springs and small permanent rivers, is gathering pace through the development of small scale irrigation schemes around water harvesting structures in the Loita plain, and the plowing of land using tractors in the Loita hills. These changes will affect trade-offs between wildlife conservation and economic development.

The second challenge facing the Group Ranch is the conflict between the expectations of elders owning a lot of livestock and young people with few animals. The former want to maintain communal land to secure access to large tracts of pastoral land for their large herds. The later do not seem to share this concern. They want to secure individual rights to land parcels in order to become autonomous and less dependent on community decisions which they consider do not serve their purposes. They welcome the Group Ranch subdivision and allocation of private rights to land because they want to be able to exclude large herds from their land, benefit individually from selling land or pastures, and invest in land improvements.

The third challenge is the collapse or ongoing transformation of local governance institutions. Elders traditionally manage land and resources, but their authority is increasingly challenged by Committees constituted of younger persons and led by a Chairman or “Village Elder” recognized by the government,

appointed in each village (*enkutoto*) or cluster of *boma* (*elatia*)[1] following the adoption of the new constitution in 2010. The decisions of these Committees reflect the interests of the younger generation, which often favors land subdivision, and may conflict with the decisions of Village Elders, who tend to reject subdivision. The collapse of the traditional pasture management regime can be partially explained by this change in governance institutions.

To respond to these challenges, we argue that effort should be invested in identifying land suitable for farming, with the purpose of allocating 3 to 5 acres of agricultural land (or 1 to 2 acres in case that land can be irrigated) to each individual family. Investment in irrigation infrastructure is also required since most land in Naroosura is not suitable for farming without irrigation, except for land in the Loita hills, which is partly covered with a primary forest and acts as a water tower for the surrounding rangelands. If irrigation is not supported at a sufficient scale, it would become increasingly challenging to avoid agricultural expansion in to the Loita hills, to the detriment of primary forests.

We also suggest the adoption of a flexible approach in which decisions about land use, and about which land should be kept common and which should be subdivided, are taken at village level. A dialogue with Group Ranch leadership should also take place to coordinate the process and address issues that require taking decision across several villages, regarding the management of wildlife corridors and of grazing banks during the dry seasons, for instance. We believe that Village Committees and Councils of Elders should be encouraged to work together to make decisions, and that each village should be free to decide the extent to which it would like to subdivide the land, that is, the proportion of land that would remain communal and the purpose of that land. Village authorities should also have the option to change their decisions in the future, in order to adjust to new constraints such as population growth or changes in preferred livelihood strategies. The application of this model can in fact be observed in other areas, such as Loliondo Division in Tanzania, South of the Loita Hills (see Research Scoping Report #4), where Village Councils (the Tanzanian equivalents of Village Committees) allocate pastoral communal land each year to individual households who need land to farm.

Regarding conservation, we suggest that each household should allocate a share of its land to a conservation area that will also be used as a grass bank for dry season grazing, with a core zone that is only open during acute droughts. The number of acres allocated to conservation by each household should be determined by science as much as by negotiation, which raises the issue of benefit sharing. The more benefits, the more acres each household will be willing to allocate. Given the low benefits typically generated by conservation, we expect that it will be necessary to provide direct benefits or compensations, monetary or non-monetary, in the form of conservation royalties or subsidies.

The report ends with a few suggestions regarding the mitigation of land grabbing and land sales to outsiders. Illicit land acquisition is the main danger brought about by land subdivision. It occurred in Group Ranches that sub-divided their land decades ago and is currently occurring in the neighbouring Group Ranch Maji Moto (see Research Scoping Report #3). Once subdivision occurs, we can expect that many Group Ranch members who have received titles will sell their land at low prices in order to access capital, to start a small business, to enjoy easy money, or simply because they are not yet fully aware of

[1] The translator uses the term “village” or “cluster” to refer to the entity administrated by a Village Elder and its Committee (probably the “Peace Committee” as it was referred to us in Maji Moto, see Research Scoping Report #3). According to informants in Maji Moto, “village” is a translation for *enkutoto* while “cluster” is a translation for *elatia*. But there is possibly variation and ambiguity in the use of these terms and their translation.

the value of the land and of the dwindling of alternative, communal resources. We suggest that the Group Ranch examines the legal feasibility of regulations and practices that could minimize this risk of land sales. These practices could be allocating land under the joint tenancy regime (in which case husband and wife can be made co-owners), requiring family agreement before land sale, banning land sales to outsiders, putting a cap on how much land can be sold, or allocating use rights instead of property rights. Maintaining part of the land as communal may also reduce its attractiveness to outsiders and reduce land sales.

1. Introduction

McGill University and the South Rift Association of Land Owners (SORALO)[2], in partnership under the research project Institutional Canopy of Conservation (I-CAN)[3], conducted a Research Scoping Study[4] in the Naroosura Group Ranch, Narok County, Kenya (Map 1, 2 and 3 in Appendix 2), from December 2 to December 12, 2016. The team included Jacques Pollini, Research Associate with the I-CAN project at McGill University; Samson Ole Silantoi, Head of Conservation at SORALO and member of the Naroosura Group Ranch; and James Oleserian Koirag, a field assistant and translator recruited locally. The purpose of the case study was to provide baseline information to inform a land-use planning process in which SORALO is engaged. This land-use planning effort is aimed at informing land-use decisions that may occur during the land subdivision process initiated by Naroosura Group Ranch, in order to avoid negative impacts on local livelihoods, ecosystems, and wildlife. I-CAN's involvement is consistent with the ultimate purpose of this project, which is to develop conservation approaches that are respectful of communities' rights and that positively impact local livelihoods. Through this partnership with SORALO, I-CAN will participate in the testing of a governance model aimed at improving conservation outcomes without negatively impacting local livelihood.

Prior to this study in Naroosura, I-CAN conducted Research Scoping Studies in the Maji Moto Group Ranch, which neighbours Naroosura to the West (Research Scoping Report #3); the Ol'Kiramatian Group Ranch, located farther East on the other side of the Nguruman escarpment (Research Scoping Report #1); and Loliondo Division, located in Tanzania to the south of the Loita hills (Research Scoping Report #4). The results of these four studies (see Map 1 and 2 in Appendix 2) will contribute to a better understanding of land use changes and livelihood and conservation challenges in this area. The three former studies identified two main processes worth investigating in more detail: the transition from pastoralism to agro-pastoralism, and the shift from communal to individual property rights that accompanies this transition. Both topics are of great relevance for land-use planning in the context of land subdivision.

2. Methodology

The methodology used for this Research Scoping Study is based on informal interviews. We did not use formal questionnaires nor organized focus groups. We employ an analytical grid that applies tools developed by the school of comparative agriculture (Cochet 2015),[5] and that is also influenced by the works of Scott (1976)[6] on the moral economy of peasants, Chayanov (1984 [1922])[7] on peasant

[2] http://soralo.org/about-soralo/
[3] http://www.accafrica.org/our_work/explore_programs/conserving-biodiversity-in-east-africa/i-can-institutional-canopy-of-conservation/ ; https://www.idrc.ca/en/project/institutional-canopy-conservation ; http://cicada.world/research/programs/i-can/
[4] The approach is similar to rapid Rural Appraisal (RRA): it has a comprehensive scope, with the goal of understanding how livelihoods and landscapes work together and to determine the the main social and environmental challenges faced by transformations. However, we use an approach quite different from what is typically done in RRA exercises, and therefore do not use this term and prefer to call our exercise a "research scoping study".
[5] Cochet, H. 2015. *Comparative agriculture*. Versailles: Editions Quae.
[6] Scott, J. 1976. *The moral economy of the peasants: Rebellion and subsistence in Southeast Asia*. New Haven: Yale University Press.
[7] Chayanov, A. 1986 (1922) *The theory of peasant economy*. Madison, WI: University of Wisconsin Press.

economics, Netting (1993)[8] on smallholder farming, Lhoste et al (1993)[9] on pastoralism, and Ribot (2007)[10] on representation in governance institutions. Informants are recruited using a 'snowball' sampling strategy. Typically, when visiting a community, we meet local leaders to explain the purpose of our work and ask a first set of general questions about local livelihood strategies and challenges faced by the community. Then we identify additional informants based on the key topics that are raised during the initial interviews. We covered 4 broad topics during this study: (1) history, in order to understand how the landscape has been constituted over time and to predict future changes; (2) livelihood strategies, where we detailed local economic activities; (3) governance, where we studied the institutions involved in decision making; and (4) challenges, where we delved deeper into the most pressing issues and collected visions about future land uses in the study area. We visited communities that are representatives of the biophysical and social diversity of the study area. We attempted to maintain a balance between interviewing young and old people, women and men, better off and worse off households, and leaders and ordinary people. However, given the short time available and the fact that our team did not include women, our sample was biased with an over-representation of male leaders.

Given the short duration of the exercise (8 days of field work) and the broad range of topics covered, we do not claim a high level of certainty for each single statement made in this report. We do not describe the situation of Naroosura as it is. We describe the situation as it was revealed by a limited number of informants. Thus our conclusions should not be considered definitive. They are, rather, hypothesis to be tested or processes to be considered in future research. In spite of these limitations, we believe the main conclusions we draw are equally or more relevant than what is derived from baseline studies based on household questionnaire surveys. By not replicating the same questions in multiple households, we can afford to have in-depth conversations with informants. We do not use statistical analyses to process data but the knowledge of our informants is based on inference derived from innumerable observations made throughout their lives. By never asking the same question twice, we can dig deep into this knowledge base, asking a broader range of questions than what is typically done in questionnaire-based baseline surveys. Triangulation between pieces of knowledge, rather than replication, is the preferred strategy to increase the level of certainty of our statements and conclusions.

All interview notes are available on demand and large excerpts of these notes are inserted into the body of this report. These notes are not exact transcriptions of the informants' speeches. They were taken as accurately as was technically feasible, but most interviews were conducted in Maa language and translated, meaning we took notes of the translation, not of the original speeches. The "citations" in the report, referenced I# with # number of the interview, or SORALO when the informants are SORALO colleagues, are thus citations of notes, edited and reorganized for clarity.

Interviews generally involved one key informants and a few other people who may have joined after the beginning. We did not record the name, age, or other characteristics of the informants, but generally

[8] Netting, R. M. 1993. *Smallholders, householders: Farm families and the ecology of intensive, sustainable agriculture*. Stanford, California: Stanford University Press.
[9] Lhoste P., Dollé V., Rousseau J., Soltner D., 1993. *Manuel de zootechnie des régions chaudes : Les systèmes d'élevage.* Paris : Ministère de la Coopération, coll. Manuels et précis d'élevage.
[10] Ribot, J. 2007. *Dans L'Attente de la Démocratie : La politique des choix dans la décentralisation de la gestion des ressources naturelles*. Washington, D.C.: World Resources Institute.

were aware of their socio-economic profile, at least when they were community leaders. The list of interviews is given in Appendix 4.

The purposes of the exercise were to collect up to date primary information; make this information available in the short term to people interested in the study area; and provide an independent view of the situation in that area, to complement existing views available in the literature. Hence there are only very few bibliographic references in this report. All information is derived from interviews conducted in several localities within the Naroosura Group Ranch (see map 3 in Appendix 2), except for (1) some information in Section 7 which is about an area adjacent to the Naroosura Group Ranch located in Loita Division (Ole Mengili, Kirtilikini, Oltarakuai, see Map 3 in Appendix 2); (2) some information in the "planning" section that was provided by a land-use planning expert hired by SORALO; and (3) some information in boxes and footnotes that was extracted from the literature. Practically all interview notes have been inserted in the report, even when marginally relevant, in order to avoid information loss. The report can be regarded as the first stage of data-processing and more elaborate processing and analyses will follow, published in the form of scholarly articles.

3. Overview of the study area

The Naroosura Group Ranch is located partly in the Loita plains, partly in the Loita hills and Nguruman escarpment, about 100 km South West of Nairobi (Map 1, 2 and 3 in Appendix 2). It is populated primarily by Maasai people, but the town of Naroosura (Photograph 1 in Appendix 3) attracts migrants, mostly Kikuyu people and Tanzanians searching for jobs and business opportunities. The climate is semi-arid with a bimodal rainfall regime. The rainy seasons normally occur in October-December and March-May, but prolonged droughts are increasingly frequent and severe. There are three main agro-ecological zones: (1) the Loita plains (Photographs 2 to 9 in Appendix 3), where the vegetation is a mosaic of grassland and savannah mainly used by pastoralists, with bushes on hilly terrain and riparian forest along seasonal streams, (2) the highlands (photographs 18 to 21 in Appendix 3), from the Loita hills to the Nguruman escarpment, characterised by a mosaic of bushes, woods, pastures, cultivated land, and a vast dense forest; and (3) the intermediary zone (Photographs 10 to 17 in Appendix 3), located on the slopes in between the plains and highlands and mostly dedicated to irrigated farming. There is a large population of wildlife in the area, mostly impalas, zebras, elephants, lions, cheetahs, buffaloes, and waterbuck.

3.1. Naroosura Group Ranch

The Naroosura Group Ranch (Map 3 in Appendix 2), created in 1973, covers 153,000 acres and has 6,000 registered members, that is, about 6,000 households who own the land collectively. The ranch boundaries match with those of Ntuka Location, located in the plains and divided between Ntuka and Nkimba Sub-Locations, and Naroosura Location, located in the intermediary zone and divided in between Naroosura, Oloirwua, and Ole Mengili Sub-Locations (Iteam). Each Sub-Location is divided into an unlisted number of villages that have unclear and imaginary territorial boundaries (see Section 5.1 about governance institutions). The Group Ranch is managed by a Committee which has representatives from most villages.

The land is divided into two blocks: Block 1 includes 11,000 acres of irrigated land[11] in the intermediary zone. Block 2 consists of all remaining land in the plain and the highlands. Many Group Ranch members live in Block 1 and practice irrigated farming. Those living in Block 2 try to settle or rent land in Block 1 or other localities outside the ranch where they can undertake farming. The plain is mostly dedicated to pastoralism, although farming is also practiced using water pumped from seasonal rivers and from water harvesting structures (small dams). Irrigation is particularly developed in Motorok, Intasati, and Ololonga, which are part of Block 2 but where water can be captured from small streams (I32).

Land in Block 1 has already been subdivided into individual land parcels several decades ago. The people living there do not have formal titles but the ranch initiated the formal subdivision of land with the goal of delivering title deeds. 1,742 households are eligible to receive land parcels. The rest of the ranch, that is, Block 2, may be subdivided in the future.

3.2. Ntuka Location

Ntuka is situated in the plains and is primarily rangeland (Photograph 3 in Appendix 3). Livelihoods in this area rely mainly on livestock (cattle, sheep and goats), although some small-scale rain-fed farming is practiced, primarily for subsistence. Local inhabitants cultivate beans and sometimes maize, although many farmers have stopped growing this crop because of frequent drought and crop failure. Irrigated farming is practiced by a few families who cultivate beans, maize and tomatoes (Photograph 8 and 9 in Appendix 3). Water for irrigation is pumped from water harvesting dams that were initially built to provide water for livestock (I2). The Location is divided into two Sub-Locations: including Ntuka that we visited.

The Ntuka Sub-Location encompasses 12 "villages"[12]. It is quite large, with distances of up to 30 km between villages, which makes it difficult for representatives of certain villages to attend Sub-Location meetings (I2). The 12 villages include (I2):

- Ole Pariata, where there are more cattle and shoats (sheep and goats) compared with other villages, and some cultivated fields irrigated by small water harvesting dams;
- Olmorrooj, which has more cattle than other villages;
- Moloroo, which has shoats and cattle, and two water harvesting dams (one private and one built by the government), used for irrigated farming;
- Oloigeruno, which according to informants has many shoats;
- Olosirua Loonkoirienito;
- Olosirua Leshiota, which is one of the poorest villages in the area, with limited access to water, many tick-borne diseases, frequent wildlife attacks on livestock, and some very small-scale farming;
- Ilngarrooj Lenkaburra;
- Ilngarrooj Loontuka, where there is some small-scale farming;
- Oloisukut Olomelok, where there is some small-scale farming;
- Kasiole, possibly the poorest villages in the area.

[11] Part of the land in Block 1 has no irrigation because the block boundaries were defined based on aerial photographs with insufficient precision to decide which area exactly could be irrigated (I32).

[12] The term "village" is probably a translation of the term *enkutoto* although there may be a confusion between the terms *enkutoto* and *elatia*, the later referring to a neighborhood or cluster of boma and being a subdivision within the *enkutoto.*

The villages differ mainly by the type of vegetation (bush or grassland), topography (most are in a flat plain but a few have rugged, hilly terrain), distance from schools, distance from water resources, incidence of livestock diseases, and incidence of human-wildlife conflicts. The poorest villages are those located in remote places, with limited access to water, rugged terrain, and bushy vegetation that provides limited grazing resources for cattle and that shelters wild carnivores and ticks (which carry diseases). These villages include Kasiole, Leshiota (I2), Olosirua (next to Moloroo), and Nguiba (I11). Kasiole (Photograph 5 in Appendix 3) is the village where life is most challenging (I11). It is characterised by hilly terrain and infertile soil. Here, crops do not grow well and there is no irrigation dam. It takes about 45 minutes to walk from Kasiole to a 'road' or trail that enables automobile transport. There is no mobile phone network, and the school is poorly equipped, with children "sitting on stones to attend class." Pastoral resources are poor because of the abundance of bushes and rocks, and herders have difficulties finding an appropriate place for weak animals. The bushy vegetation shelters carnivores, which attack livestock. Several villagers and a ranger have been killed by elephants. With the exception of these particularly poor villages, other villages are located on more hospitable ground and are not significantly different from each other (I2).

Each village is inhabited by about 200 women and 100 men, and each woman has about 4 children. In the Ntuka Sub-Location, there are 7 primary schools and 3 pre-schools. There are approximately 1,200 cows and 2,000 shoats in each village, making 12,000 and 20,000 respectively for the whole Sub-Location (I2). Water for livestock is mainly provided by four main springs (in Ntuka, Loonkoirienito, Oloigeruno, and Leshiota) and collected in small dams. Water for human consumption is also piped from Naroosura (6 of the villages have access to this piped water).

3.3. Naroosura Location

Naroosura is located mainly in the intermediary zone and the highlands. It has three Sub-Locations. Farming is more developed than in Ntuka. Irrigation systems capture water from springs and small streams running down the escarpment slopes (Photograph 11, 14, 15 in Appendix 3). Rain-fed farming is also practiced on the top of the escarpment, around a large forest that provides grazing resources during the dry season.

Based on the results of this study, it appears that there is more land suitable for cultivation than is currently used. For instance, there is water and fertile soil along the Kanunka River, along the road that climbs the hills south of Naroosura town. This area is currently reserved for dry season grazing and is populated by a few temporary settlements (I5).

The forest on the escarpment is under intense pressure as it is cleared for expanding farms (Photograph 21 in Appendix 3) and pastoral areas. Young people attracted by the suitability of land for both rain-fed farming and pastoralism, establish settlements along the forest edge (Photograph 18 in Appendix 3). Their settlement contradicts the rules of the elders and they may be forced to relocate downhill in the future (I4). However, we also find long established communities in the highlands, such as Ole Mengili (Photographs 19, 21 in Appendix 3).

4. History

4.1. Ancient settlements and historical sites

Naroosura has long been inhabited, as evidenced by the presence of two historical sites of great local cultural significance. The first site is known as Eseit Oltatuani, meaning “the cave of the strong man” in Maa language. In local mythology, the cave is said to have been inhabited by a giant who raided the Maasai people. Maasai elders decided to bring him a young woman who became his wife, and then helped moran (Maasai warriors) to access the cave. The giant was killed in a surprise attack, aided by his wife, who cried for having betrayed him (Iteam).

The second site is the grave of Olenana, an ancient paramount Maasai Oloiboni (ritual performer and traditional healer) who used to perform rituals. Olenana is considered to be one of two brothers (himself and Batian) from whom all Maasai originate. Olenana was later forgotten because he agreed to give Maasai land to British colonists. His son, Senteu, subsequently became the Oloiboni of the Loita Maasai, while Batian became the Oloiboni of the Purko Maasai. People from Oltarakuai (Map 3 in Appendix 2), where the grave is found, are said to be descendents of Olenana (Iteam). Every person that passes through the site is required to drop a rock as a sign of respect (I21).

4.2. Settlement in the Loita plains

According to interviews conducted in the Group Ranch Maji Moto, which lies adjacent to Naroosura Group Ranch, people living in the Loita plains are Purko Maasai whose ancestors originated from different places. They arrived in the area during the early colonial period after white settlers pushed them off their native land in the northern part of the rift valley. When they arrived in the Loita plains, the land was already inhabited by the Loita Maasai, and the two tribes subsequently raided and fought each other until the British administration intervened and set territorial boundaries. The Purko were pure pastoralists who generally followed a nomadic way of life. They lived in the plains during the rainy season and moved to the highlands during the dry season (I13). But some settled in the area to flee cattle diseases (I5) or taxation and conflict with British colonists (I11). Regarding the Loita Maasai, they now inhabit the area south of the Loita hills. Conflicts between the two groups over access to land and resources still exist, as we will describe in Section 7. I31 below tells us the story of the first settlers in Oloisirua (see Figure 3):

> I arrived and settled permanently here in 1955 when I was a little boy, with my father and his three wives. Our livelihood depended on pastoralism. We came from a place called Oletukat, on the other side of the Ewaso Ngiro River, south east of Narok. We settled here permanently because the area was good for livestock. At the time, there were fewer livestock and fewer settlements than in the place where we came from. There was only one manyatta (traditional settlement grouping several households within the same enclosure) with 6 households. Each family had between 50 and 350 cows. The herds were divided into two groups, with one group calving in the dry season and the other group calving in the wet season, so that there was always some milk (I31).
>
> More herders came seasonally because the area was very suitable for livestock. Cattle fattened rapidly. There is a salt lick where people can bring their livestock between March and June. Some people tried to stay in the area beyond June, but we told them to move away. We did not allow

migrant livestock to cross the dry season grazing area, so they were told to move their livestock back to the Loita hills. This was an agreement made by the elders and it was respected (I31).

Pastoralists who established a permanent settlement here arranged to manage grazing land jointly. The little valley [with a seasonal river] was the boundary between land that was dedicated to rainy season grazing, where the settlements were established, and land that was dedicated to dry season grazing. People only raised cattle and the cattle population grew rapidly because of sufficient grazing resources. We burned the land during the dry season to create fresh pasture when the first rain arrived (I31).

People never experienced severe drought. Droughts were infrequent, occurring about every 10-25 years, instead of every 2-3 years as is the case today. Nevertheless, we sometimes migrated temporarily to places like Elangata Enterit or Enkutoto, when the pastures in our territory were dry. We went to these places not because we had no pasture, but because there was fresh grass there. Men moved while women and children stayed permanently at their homes in the settlement (I31).

There was no problem with wildlife at this time because there was enough space. For example, buffalo lived in an area that our livestock could not reach. The carnivores had enough space and were not a threat like they are today (I31).

The main problem we faced at the time was livestock diseases. There was foot and mouth disease, black cow, anthrax, and tick-borne diseases. Ticks were a serious problem because the only way to prevent them was by burning the land and by rubbing the cows with a piece of cloth where the ticks were embedded. Cattle dips were not introduced until the late 1970s. Every few years there were also campaigns by the veterinary department, to help control foot and mouth disease and to administer vaccinations (I31).

Things changed during the mid-eighties. People started to raise sheep and goats (shoats) and the frequency of drought increased. The population of cattle declined and the number of shoats increased because shoats resist better to droughts than cattle. Shoats were used to purchase food. A sheep was sold for 12 shillings, which was enough money to buy maize flour for porridge for one month. More families began to move into the area in the early 1980s until the 1990s, establishing big settlements. These migrants arrived from different places: Enkutoto, Naikara, and Siena. They settled here because the land was less populated and was big and open. The livestock were healthy because the area was burned every year, which provided fresh grass and reduced the number of ticks. The new settlers had to ask the elders where they could settle. The community maintained the same grazing pattern, with one area set aside for dry season and one area used during the wet season. This pattern is still applied today even though the population is much higher. However, we changed the rules regarding access to the salty area because of excessive demand for this resource. Now we authorize access to the salt lick during a period of 40 days only. Herders come in shifts. We do not refuse access because the place is a known area for salt, but pastoralists who need to use the resource must first show that their herd is free from foot and mouth and other contagious diseases (I31).

After the 1990s, there was no new settlement because of the approval of the Group Ranch registration. All people were registered in a certain place and nobody could then settle in a new place where he was not registered (I31).

According to this story, there are three main historical periods: (1) a period of nomadism or semi-nomadism which lasted until the 1980s, during which livelihoods depended almost exclusively on cattle raising, grazing resources were abundant, conflict with wildlife was limited, and the population density

was low; (2) a period of semi-nomadism (from the 1980s until the 1990s), during which the number of goats and sheep per household increased, the number of cattle decreased, droughts became more frequent, grazing resources became constrained, and the population significantly increased; and (3) a period with less immigration after the registration of the Group Ranch. We will see that since the 1990s, pressure on land and resources has increased, access to education has improved with the construction of new schools in the plain (I25), and livelihood strategies have become diversified, with farming playing an increasingly important role.

4.3. Settlement in the intermediary zone

I29 recounted the story of the first settlers in the intermediary area (Block 1), in between the plain and the highlands, where irrigated farming is now the main economic activity. Through this story, he also describes the transformation of the livestock system over time:

> This place is a very old settlement. My great and great-grand parents have lived here for a long time. We have covered 6 generations. These hills were covered with forest. It was very bushy. Then we burned the forest to create pastures. There were very few people and we decided, after we cleared the forest, to have a permanent settlement (I29).
>
> In the past, we had very large cattle herds. We had cattle with very long horns. We still keep these cattle, although some new breeds are coming in. Also, the type of pasture has changed. Some species of plants are no longer seen. There used to be a type of grass that grew like corn and had flowers on the tip but this is no longer here. Now we only have very short grasses that don't last long. There was so much rain in the past. Now there isn't much rain. There are very long periods without rain (I29).
>
> In the past, there were many animal diseases and they were contagious. There was a disease that makes a big thing on the ear. It was called lipis or oltikana. It was transmitted by ticks. Another disease made the cow confused and run around. This disease is still here, but it is now a common problem for shoats more than for cattle. There is no vaccine for it, even today (I29).
>
> Another difference is that the population was lower in the past. There was not much destruction. Now there are more people so the destruction of grass has increased. Not everybody has cattle and this destruction is also caused by the settlement process. Before, there was a place for settlement but now, people have spread all over. The grass around the settlements has been destroyed. Even someone with only 1-2 cows has an impact on the grass. The other cause of this change is that there were no shoats. Now people raise shoats in large numbers, even more than cattle, and they graze more than cattle. We started raising shoats in the 1980s, at which time we mainly raised sheep and only had a few goats. The sheep graze to reach the roots. This has impact on the pasture (I29).
>
> Another change that is causing the grass to disappear is that before, we had a patterned grazing system: one area of the pasture for cattle, one area for shoats, and one area for weak animals. It was like this when the elders were the leaders. But since the new generation took over leadership, everyone wants to have freedom to spread their animals all over the area (I29).

As in the plains, the intermediary zone has undergone a transition from a period with many cattle and abundant rain and grazing resources, to a period of higher population density and resource scarcity. This has led to a shift to agro-pastoralism and from raising cattle to raising shoats. I29 also describes the erosion of the traditional governance system, an issue which we will describe in more detail in Section 6. The main change that has occurred in the intermediary zone is the development of farming, which

began in the late 1960s. This transformation is narrated in the following three interviews (SORALO, I25, I26):

> Since the construction of the first schools in the intermediary zone in the late 1950s (It, I25), and the development of farming in the late 1960s, most households decided to settle permanently in the area, which is now the most populated. People started to have more knowledge because of the schools, where they learned about farming and irrigation. They began to settle around rivers to cultivate small parcels of land. Men asked for land to farm when their children started to attend these schools, and often married a second wife to be able to create two settlements. They kept their initial settlement in the plains and added a new settlement in the agricultural area (Iteam). However, interest in settled cultivation in the area developed mainly after the big livestock disease of 1966-67, which killed almost all the livestock (SORALO, I25). Before this, people had large herds and were not interested in farming. There was very little agricultural land and it was owned by about 5 families, each of which held about a quarter or half an acre (I25).
>
> People learned about agricultural techniques from migrants who brought their knowledge. For example, one man learned how to farm when he married a woman from a Kikuyu community. (I25). There were Kikuyu migrants from Oloitoktok and Chagga migrants from Tanzania. They brought their knowledge and experience in farming and also provided labour. They partnered with Maasai people and asked for 30-40% of the production. The Maasai eventually realized that they could make more profit by farming themselves. Today, 80% of agricultural work is done by Maasai people and 20% by non-Maasai who lease the land (Iteam). One Kikuyu community settled in Kanunka and still exists today (I25). After independence, the Maasai gave the Kikuyu a stony, bushy piece of land. At that time, their lifestyle was different, but now they are almost like Maasai. They speak Maa and very little Kikuyu. Their land is carved out of the Naroosura Group Ranch (Iteam).
>
> In 1976, agricultural experts from the government brought chemicals and fertilizers and supported the development of irrigation (I25). At that time, people planted corn and beans for subsistence. With irrigation, they began to plant cash crops like onions and tomatoes (Iteam). The ox-plough became increasingly prevalent between 1976 and the 1990s. A flour mill with an engine was also introduced in 1976. It replaced the small manual flour mill that had existed since 1966. Tractors were introduced in 1980. It was a gradual change. We started by hand and then used the ox-plough and then moved to another level with the tractor (I25).
>
> Irrigated farming first developed on the hill sides, where irrigation was easy. Then it spread to the lower parts of the hills. After the disease of 1966-67 wiped out all the cattle, people who had not practiced farming realised that those who did some farming during the dry season were benefiting and had food even though they no longer had cows. So, those living lower on the hill decided to do the same. They travelled along their river to assess where to put a canal for irrigation, and found a place where they could divert the water. They divided the land so that each household could have its own piece. They grew only maize and beans at the beginning, and began the commercial planting of onions and tomatoes in the early 1980s (I26).
>
> The land suitable for cultivation was subdivided under the authority of elders, who put markers on the landscape to set boundaries. Household received land proportional to their family size. The distribution was not equal. It ranged from about 1 to 12 acres in Kuseka (Figure 3). There were a few disputes but communities agreed overall (Iteam).
>
> The Chiefs were also involved. If you did not have a piece of land for cultivation, they would force you to cultivate a very small plot. Many people were disciplined if they refused to practice farming. They were punished. At this time, people were often disciplined and undertook their

> obligations to the community immediately, unlike today. Mandatory farming lasted until 1980. When enforcement stopped, people had made a lot of profit so they continued to farm on their own (I25).

This story showed that the development of farming has multiple causes: (1) the need to find an alternative to pastoralism after a major disease outbreak killed most livestock; (2) the loss of livestock after major droughts; (3) coercive action by the government; (4) the spread of agricultural knowledge though contacts with Kikuyu farmers; and (5) the existence of water resources that render farming extremely beneficial during droughts. Today, some young Maasai are more interested in farming than pastoralism, as we will describe in more detail later in this report.

4.4. Settlement in the highlands

The highland area in the Loita hills is one of the southernmost Purko settlements on former Loita land. Purko people have settled even outside the Naroosura Group Ranch, in the Morijo area in the Loita Division which is mainly inhabited by Loita people. This has resulted in conflicts which we will describe in Section 7. The history of the area around Oltarakuai and Kirtilikini, two Purko villages of Morijo Location, from the point of view of Purko elders (from I20 and I23) is described below:

> Our community was established about 8 generations ago. Initially, the ancestors came to the area seasonally, but they eventually established permanent settlement in the 1940s at the time of the Ilterito age set, following a major disease outbreak that killed a lot of livestock in the 1930s. The disease struck the Mara area and we were told to come here because it was rich in pasture and forest. We decided to settle permanently and had no more disease outbreaks until 1967, when we lost our herds and had to re-establish them (I23).
>
> Our ancestors are Purko people who came from Nairobi and from the Kaputei plains in the Kajiado district. We were pushed out by the railway. Before we settled in Kajiado, we lived in Laikipia. The three families that first migrated here are originally from Laikipia. They moved to the Kaputei plains, and finally migrated here. We have been told by our father that we all came from Laikipia. All the Maasai come from Entorror (called Doldol by the British). We are told that this is where we come from (I20).
>
> In the 1940s, there were only 3 *manyatta* here, with 10 people per *manyatta*. They were established down the slopes or in small valleys. The vegetation at the time was more open with less trees and shrubs. The grass grew taller because there was less grazing pressure from livestock. The plains was similar to today, but the forest extended farther down the slope. Fires were ignited in March in the buffer zone of the forest to generate more grass, before the first rains, and to clear forest and bush to reduce predation from wildlife. Burning was stopped in 1982. People realized that there was not enough pasture to burn and that the rain pattern had changed and was no longer reliable. Stopping burning was a community decision, although the government had requested this because fires were threatening the forest (I20).
>
> In the past, each *manyatta* had 100, 150 or 250 cattle, with no sheep and goats. There was no farming because people had enough livestock to make a living. The diet was based on meat, milk and blood. Grazing was organized like elsewhere, with some land up the hill and near the forest reserved for dry season grazing, and some land in the plains reserved for rainy season grazing. These arrangements still prevail today, in spite of higher population pressure and the spread of settlements across the landscape. Temporary migration to search for pasture was not necessary even during the droughts (I20).

> People remember several droughts. One occurred in 1948-49. During this drought, herders did not migrate with their livestock because there was no rain anywhere. The whole forest was dry, with no forage to harvest except along the Kanunka River where Robert O'Meara [a Kenyan of European ancestry, see Section 7.3] was living and running an ecotourism and conservation project. People lost a lot of livestock at this time. However, the worst disaster was the disease of 1967, called Lipis [Nagana]. Many livestock died, particularly cattle. This motivated people to start raising more shoats and begin farming (I20).
>
> Before we began farming, we obtained corn flour from a place called Mulot in the Kipsigi community. When we travelled there, we saw the ploughed fields and the crops growing, and we knew that something was planted and harvested and that people made flour out of it. There was also another community in Tanzania called Lampuru. We brought Kipsigi people here so that they could show us how to grow crops. When they came, we gave them pieces of land to make demonstrations for us and they taught us how to farm. They farmed and harvested for themselves but never settled here. We exchanged livestock for some of their harvest as we did not have much money. They stayed here for 5 to 10 years, at which time we were trained and could farm by ourselves. We were not very good farmers so everybody did just what he was able to do. It was a difficult job. We paid some Kipsigis people to help us work on the farm. We used only hand hoes, which were very tedious. We grew maize, but also beans, Irish potatoes, and pumpkins. We began growing these crops at the same time as maize. Beans were planted alongside the rows of maize, and we planted a small amount of Irish potatoes and pumpkins (I20).
>
> We decided to cultivate in the buffer zone of the forest on the same land where we farm now, because the land is more fertile there, and because it opened new land for livestock and allowed us to keep the grassland for livestock. The cultivated land could be grazed by livestock after the harvest during the dry season. These decisions were taken by the elders (I20).
>
> When we started to farm, the population density was still low and we ate maize only during the dry season when there was no milk. Two 90 kg bags were enough for a family, because we ate porridge, not *ugali*, and because our children were not given corn flour. We ate flour only during severe droughts (I20).
>
> We began using the ox-plow in 1988. We learned to do this from the Kipsigis people. We first thought it was a punishment for our cattle and did not like it. However, as we expanded our farms, we went back to the Kipsigis to ask them how to use the ox-plough to open the land. Now, since 2014, we also use tractors (I20)."

The last quote above reveals the interplay of economic and cultural factors as determinants of land use changes. It shows that in that case, culture slowed down changes but did not stop it. Economic constraints overcame cultural constraints eventually because people could not escape material realities like like the amount of available food. The Maasai were at first reluctant to use the ox-plow and could afford not to adopt it as long as they could survive without significant farm output. But when the dependence on farm products increased, they could not afford to miss the opportunity of increasing their farming acreage through the adoption of the ox-plow.

I29 tells a similar story, about the development of farming in Ole Mengili, a village located farther West in the highlands:

> Farming began in the area a long time ago. There was a Kikuyu man who came and made a small *shamba*. We were very young boys at that time, about 8 years old. That was the first time we saw

> corn being planted and germinating. The only food we knew before was milk, meat, and blood. We did not know anything else. We bought flour from other places but we did not know where it had come from. No one was educated at that time. The only work we did was looking after livestock. After we observed the young Kikuyu man planting corn, we asked him some questions about the corn. The small *shamba* planted by that Kikuyu was where we learned about farming. We tasted the sweetness of the corn. We borrowed one and boiled it and tried it. The man also started to plant potatoes. We did not know how to eat them. We put them on fire or boiled them and ate them. We did not know that the skin had to be removed. 23 years ago, we came to understand more about corn. We saw that we could make flour out of it. We also realized that our land is fertile enough to grow corn and potatoes. The elders decided we would farm only in the forest, not in the plains, which was used for grazing. So we decided to clear the forest to cultivate and we planted potatoes in areas where settlements had been abandoned. We had a very nice area for farming but we did not realize this before. The age set before us did not know anything about farming. People of our age are the pioneers. At the beginning, we dug with hoes. Then we started to use some bulls for plowing. Farming became even more efficient two years ago, when we realized that the tractor can make it easier. But it is still impossible to do large-scale cultivation because people do not have enough money to invest and rent tractors. Not everybody is capable to pay for a tractor to prepare the land. Also, we depend mostly on rain and can get a good harvest only when it rains. If rain is lacking, there is no farming and we revert to our previous life of poverty (I29).

These stories illustrate that farming in the highlands, like in the intermediary zone, developed after a major livestock disease outbreak and was facilitated by contact with Kikuyu and other peasant groups. In the highlands, there is no irrigation but larger areas can be cultivated because there is still a lot of available land. Ox-plows and more recently tractors are used to plow the land.

4.5. Ecological changes

Consistent with what is reported across Maasai land in Kenya and Tanzania, several informants mentioned the increasing frequency and length of drought as the main environmental change of the last several decades (I2, I3). In the past, there was a long rainy season lasting from March until June, and a second rainy season from September to December. However, currently the rains are short and strong, leading to flooding and land degradation (I2). They are followed by prolonged droughts (I2, I3, I5), generating livelihood hardship for people (I2, I3). The last major drought occurred about 5 years ago (I12).

Another important ecological change concerns the vegetation. The bush vegetation is reported to be the same as in the past (I5), although the density of grass is lower today and some species have disappeared. The vegetation is also patchier. In the Ntuka Sub-Location, some species of grass are no longer observed (I2, I5). Examples of grasses that are reported to have disappeared include the perennial *Orperesi Orasha*, the annual *Erikaru* (I2, I5), and *Inaumorua*[13] (I5). *Orperesi* was a very tall grass found mostly in bushy areas. It is reported to have completely disappeared after two consecutive years with no rain. *Orperesi* was "the best grass for cattle, and cows could hide in it even while standing, leaving only their heads visible" (I5). *Erikaru* was a short grass that did not last a long time but was also very good for cattle. It grew in high places, around bushes. It disappeared at the same time as *orperesi*, "after a prolonged drought that occurred after independence, when Kenyatta was President".

[13] This is possibly an incorrect spelling of *emeurua*, which is African star grass or giant star grass or *Cynodon plectostachyus* (K. Schum.) or Pilger, from the Poaceae family.

Inaumorua also disappeared at the same time, although it can still be found in small quantities in a few places. It was "a very nice grass and was good to fatten cattle" (I5). Some species of wild fruits disappeared too' for example *Ingonom*, *Lyberitia*, *Ilama*, and *Lyngangayo* (I2).

The main reasons for these changes include human population growth and overstocking of shoats, particularly sheep. An improved breed of sheep, called *dopa,*[14] is considered to have had a particularly strong impact (I2). The collapse of local governance systems (see Section 6) is also a major cause of land and pasture degradation (I2). As people believed that the lack of rain was caused by curses (I5), they brought gifts to the *Oloiboni* who organized livestock sacrifices and other rituals to ask for rain.

4.6. Socio-economic changes

Socio-economic changes in the area are similar to those observed in neighbour localities like Maji Moto Group Ranch (see Research Scoping Study #3). I29 describes the major changes he experienced in Ole Mengili, in the highlands:

> One important change that occurred over the last decades is the improved access to education and increased interest of Maasai households to educate their children. In the past, there were no local educational facilities and missionaries came to take children to schools, which was perceived as a very bad thing. People called for the *Oloiboni* to prevent children going to school. They thought these missionaries were enemies coming to destroy their culture. By around 1960, people began to understand the purpose of education so some children started to go to school at this time. They have since realized that there is something good in education. But until today they are not satisfied. The children have not received enough education (I29).
>
> Another change was access to health care. Before, there was no hospital, and there was no road, so people had to transport sick people to Naroosura using a *shuka*. Some died on the way. Today there is still no hospital but there is a road, although during the rainy season, vehicles are not able to come up to the settlements. Even motorbikes cannot come so it is still necessary to transport people with *shukas (I29)*.
>
> Changes also occurred regarding human habitation. In the past, settlements were small traditional Maasai houses. Later, people started to build larger houses with grass on the roof. Now they have iron sheet roofs, which are more comfortable (I29).

Regarding changes in behavior and attitudes, people in the past were described as being "good, not like today's people." They "did not steal and there was no politics." The land was communal. It was not divided, which was appreciated. Land subdivision started after independence when the modern system of government was adopted. Prior to this, land was managed by the elders. However, white colonizers had arrived and people had to pay tax in the form of a big bull (probably per household) to the colonial government (I5).

Opinions about whether life was easier or more difficult in the past vary. According to one elder living in the highlands, in the past, people suffered from poverty because they were not aware of farming and suffered a lot during the dry season when there was no milk. But now they plant potatoes, maize and beans, and the situation is changing. Also, there were very bad animal disease epidemics transmitted by ticks, which affected the livestock. There was no medicine or spray, so cattle died. There were also problems with food security. People slaughtered livestock to get food or depended on blood. Today,

[14] Probably the dorper sheep. See http://www.livestockkenya.com/index.php/sheep-a-goats/208-sheep-breeds-in-kenya.

there is still difficulty in accessing water, but people have improved their livelihood security through farming (I29). The permanent change began in the 1980s, when people realized that farming was necessary, wanted their children to attend school, and sprayed products to eliminate ticks on their livestock (I29).

In the Ntuka Sub-Location in the plains, life is reported to have been easier in the past. Twenty years ago, there were only ten *manyattas* in Pariata. Now there are 20. There was no school, no church, but plenty of water and more abundant rain and grazing resources. The biggest problem was human-wildlife conflict, not drought. Now life is harder. There is more livestock on the landscape because of population growth, but each household has fewer livestock because it is difficult to reconstitute large herds after division through inheritance. This difficulty to restock may be explained by the more frequent droughts and by an increased need for cash. People must now pay for school fees and healthcare, and also want to build modern houses (I2).

According to a different informant, poverty did exist in the past. Some people had no livestock just like today. But poverty was rare because people were "more disciplined." When someone misbehaved, a sheep would be slaughtered and the person could be "beaten, stripped of his clothes and put on an ant nest" (I2). One of our team mates explains the exceptional circumstances under which one of his ancestors became poor:

> I have an uncle, brother to my father. When he was supposed to be circumcised before becoming a warrior, he ran away and became a warrior before his initiation, by going to another County where they did not know him. This made him an outcast and he never owned a single cow. He went from brother to brothers to look after their livestock and never married. He was just fed and given clothing by others (Iteam).

An important variable determining wellbeing is access to water. In the past, there was more rain so access to water may have been easier in many places. However, there was less infrastructure. Recently, the government and NGOs have built water harvesting dams, drilled boreholes, and even piped water. The localities that benefit from this infrastructure are possibly better off today. In Ole Mengili for instance, people used to walk very long distance to collect water at the source of the Kanunka River, to sustain both cattle and people. Women walked to collect and carry back the water, over long distances. Many people became ill from carrying water and sometimes cattle died along the way. The situation became a bit easier when a NGO came to construct water harvesting structures (dams), so in these areas, the water lasts for a long time. During the dry season, though, it is still necessary to walk long distances to get water (I29).

More information is required to explain the changes occurring in the area, but we can hypothesize that the economic situation improved in the highlands because of the development of farming, while it worsened in the plains because of population growth, the increasing frequency and length of droughts, and the difficulty of developing significant farming in that area. Livestock may also have been more prone to diseases in the colder and wetter highlands, and have therefore benefitted more from progress in livestock healthcare.

5. Livelihood

5.1. Pastoralism or farming?

The main livelihood strategies in the Naroosura Group Ranch are pastoralism and farming. These activities are generally combined. Most household attempt to access land that can be farmed in the intermediary zone or the highlands, and pasture land in the plains for grazing during the rainy seasons.

Different people held different opinions about whether pastoralism or farming is the most important livelihood strategy. The elders tend to prefer pastoralism while younger people are more interested in farming (Iteam). Some people felt that livestock provides a better economic and livelihood return and is less risky because there is less variation in prices. They argue that livestock should remain at the core of the economy in the future, and that attention should be given to improving the breeds and forage systems. They suggest adopting a paddocking system of management lying somewhere between free-range and zero grazing (Iteam). In contrast, others felt that money should be invested in farming rather than livestock. Livestock would continue to play a role but new management models are suggested. For example, one young Maasai involved in farming mentioned that farm income can be used to buy cheap livestock in poor health at the end of the dry season. Once these weak animals are fattened, they can be sold a high price at the end of the rainy season (I18).

Beyond these different perspectives, agricultural and livestock are perceived as complementary (I14). Livestock enables to survive when there is crop failure or when market prices for crops are low, while farming is necessary to avoid excessive livestock sale to buy food, and to enable more rapid restocking after droughts (I31).

Wealth is generally defined by the number of livestock that one owns. A household with fewer than 10 to 20 cattle and fewer than 30 shoats is considered poor. A family of one man and 3-4 wives owning approximately 300 cattle and 400 shoats is considered rich (I31). According to a different informant, in order to sustain itself, a household requires approximately 10 cattle and 100 shoats, along with 100 acres of land for grazing and cultivation (I17). Many households are below this level. In Olosirua, out of 13 families (each consisting of a man, his wives, and their children), 5 are considered rich, 3 are in the average range, and 5 are classified as poor (I31). In the Ntoka Sub-Location, where livelihood depends mostly on livestock, about 30% of households do not own any cattle, and 5% have no livestock at all (no goats or sheep either). For those 70% who have cattle, they own an average of 20 heads per household, ranging from only 2 to a maximum of 50.

The reasons for not owning livestock are multiple. Some young men did not inherit animals from their parents and found no way to acquire livestock on their own. Some lost all their animals because of a prolonged drought or sold them to pay for school fees or hospital expenses. Some “ran away from home, enjoyed life and neglected their families.” Some “were irresponsible, didn’t want to work and liked to drink.” Others “had been cast out of their homes” (I2). For these various reasons, young men who grew up in rich families with many livestock are not necessarily rich. They may have mis-managed the livestock they inherited from their fathers, or lost their animals during a severe drought (I6).

The way in which people value their livestock is also changing. In the past, there was abundant grazing land and people tried to “own as many livestock as they could pay for” (I11, I31), instead of investing in a buying land or building a house. A person owning a large herd of cattle was considered a “giant”. But

today the land is “full”. Some herders “cannot buy livestock because they would not know how to feed them.” They need to “figure out a strategy before they purchase animals” (I11). New ways of defining poverty and wealth are appearing as a consequence of these livelihood changes.

Increasingly, people say they are more interested in support for developing farming rather than livestock. This is the case for I8, from Paratia, who asserts that crops generate an income, which reduces the necessity of selling livestock since crops can be consumed during the dry season when there is not much milk. Crop residues can also be used as livestock feed during the dry season. In case of drought, it is “easier to manage crops than livestock” because their price is more stable. Livestock “can be worth as little as 500 KSh, while there is no such price reduction for crops” (I8). Farming also generates jobs that are interesting for young men who seek income to buy food and clothes (I8).

5.2. Pastoralism

5.2.1. Livestock management around the *boma*

Livestock is managed according to rules decided at community level by the Council of Elders and/or the Village Committee (see Section 7), at the scale of the village (I2). I31 describes the traditional grazing patterns that was practiced in the past. Today, this system is mostly abandoned and traditional rules are no longer respected. However, it still persists relatively intact in Olosirua, possibly because of the limited presence of farming in the area:

> In our community, pastoral land for cattle and shoats is divided between an area for rainy season grazing, and an area for dry season grazing. On the rainy season side, cattle and shoats can move freely within the entire area. On the dry season side, they are separated, and the shoats are brought upstream while the cattle remain downstream. The elders decide together when the livestock needs to move from one area to the other (I31).
>
> There is no paddocking and the land is open. However, the livestock are moved according to a pattern. Each day, the elders decide which place the livestock will be kept and for what period of time. All the settlers of the area must move according to the same pattern. The children who look after the livestock must do as the elders say. Sometimes, some try to move their livestock ahead of the others. The elders then warn the parents that if their children do not respect the rules, their livestock will not be authorized to graze there anymore (I31).
>
> Besides the dry and rainy season grazing areas, there are also specific places reserved for weak animals. These are called *olokeri*. There used to be one *olokeri* for the whole settlement but as the population is higher today, there are currently 3 *olokeri*: one for each group of settlements. Each group only uses its own *olokeri*. A group of *manyatta* is currently requesting its own *olokeri*, in which case there will be four. Some people with lot of livestock may also be given permission to create an *olokeri* just for themselves, but this must be done in consultation with the elders (I31).

A similar system existed in the highlands:

> In the past we had a main area where all the homesteads were located. It was here where we are right now. The land up the hill was for the cattle. The hill on the other side, which is almost like a plain, was for the shoats. It was not preserved for the dry season. We also had a small place where we kept the weak animals. It was mostly kept off-limits during the rainy season so that it would have grass during the dry season. It was sub-divided to create an area for very small calves and an area for those already a little bit grown up. There was a fence. When the dry season

> began, we opened that place but only for the sick animals and the calves. One could also request to keep an important bull or some milking cows in that area. The request was addressed to the Council of Elder. We had a Council of Elders that was in charge of these processes. They were the very old people. And if you made your own decision and contradicted them, you were punished and even caned (I29).
>
> During these days, the grass was never depleted by grazing. Our only problem was lack of water. We walked long distance because of lack of water, not because of lack of grass. We have a small spring that was used during the dry season. The area around it was not grazed during the rainy season. There were rules that we were required to respect because it was a small spring. Each day, access was granted to the cattle from a certain settlement (I29).
>
> Maybe it is possible to go back to the old system but it would be a very difficult and long process because all the authorities would need to be consulted. To destroy settlement and bring the *boma* back to the same place, together, like it was before, is not possible. The lack of discipline is reducing my power. The young say these are rules from the olden days so there is nothing I can tell them (I29).

This example shows that the traditional grazing system is not respected by the younger generation, as will be see in section 7. Otherwise, it is quite consistent in different places. The land is divided into three main grazing areas: one for the dry season, one for the rainy season, and one for weak animals. There is sometimes a distinction between grazing areas for cattle and for shoats. Livestock from a group of settlements moves together over the landscape according to flexible boundaries that are defined by the elders and may not be physically visible. Besides these general rules, which seem to have existed in all villages, there are also more specific rules that vary depending on the place and that we did not investigate in detail. Below we provide an example of some livestock management rules set up by the Council of Elders and/or the Village Committee in Kasiole, one of the poorest village in the Ntuka Sub-Location. Kasiole is a place where traditional management and collective uses of resources seem to have been more preserved than elsewhere:

> For the preservation of pastures, during the rainy season we set aside one hill to be used when the drought approaches. Also, during the dry season, some goats are fed with tree leaves. If you feed your goat that way, you can only cut the branches, not the main tree. We can also decide to migrate as a group to places like the Mau forest, Mara, and occasionally the Loita forest. Water sources are separated. One is for shoats, and one is for large cattle, and you are not supposed to take water for shoats from the source that is for cattle. We are very strict on this rule. Also, we are living together but one has to have some privacy in his settlement so I am not supposed to take my cattle around the next *boma*. If I do it, I face customary law. These are the rules we follow. They have existed since the time of our grandfathers. We did not change any. The rules for drinking sources were there. Also, the rule about respecting privacy around the *boma* was there. All these laws existed before (I10).

Regarding livestock management within the household, livestock in Olosirua is managed by the oldest man of the *boma*, consistently with tradition. But nowadays, sons are often given responsibility to manage cattle once they are circumcised and married. Married young men normally stay in the same *boma* as their father, although each is assigned his own cattle. Father and sons help each other to look after their livestock and restock when a drought causes livestock losses. But this solidarity is declining. Today, if the father loses all his cattle, his sons may break with custom and decide not to help (I31). In sum, elder authority is declining at both the community and the household level.

5.2.2. Short-distance livestock migrations within the Naroosura Group Ranch

Pastures in the plains offer abundant resources during the rainy season, while those in the highlands are critical during the dry season. In the intermediary zone, where irrigated farming is practiced, grazing resources are limited during both seasons because farming is practiced throughout the year. These differences determine livestock movements between the three zones.

People living on the slopes where irrigated farming is practiced send their livestock to the plains where they can access salt licks during the rainy season. Initially, it was not required to ask any permission to do this. But today, herders must first ask permission from relatives or friends. Someone who lacks social connections may fail to obtain permission, but this is uncommon. During the dry season, the livestock is moved back to the agricultural area and to the highland pastures. Young and sick animals graze around the fields and settlements, while the rest of the herd is moved higher into the mountains (I24). Another option is migration to river banks, for example to grassy areas along the Ewaso Ngiro River (Iteam).

Migration to the plains to access salt licks during the rainy season is of great importance for livestock. This migration and the establishment of temporary settlements, called *ronjo,* is also an important social event. The *ronjo* period is considered a good time of the year because there is an abundance of milk and wild fruits. *Ronjo* normally lasts for approximately 6 months, from March to June or July. Today, it is less important because the rainy season is shorter. Migration is now more opportunistic. Herders move primarily to places where it has rained. *Ronjo* is also disappearing because there are permanent settlements everywhere. If one wants to stay in the salt lick areas, those living in that area complain (Iteam). The young people also refuse to practice *ronjo* because during their stay at the salt lick, they don't have a house and lack good food. They just make a fence for the cattle and may sleep outside even when it rains (Iteam).

5.2.3. Long-distance livestock migrations outside of Naroosura

In the past, dry season migration was organized at the scale of an individual settlement or a small group of adjacent settlements. Now, land is now longer communal and it is not possible to migrate as a community. Therefore individual decisions prevail (I5).

Herders living in the plains have several options for dry season migration. Those with small herds generally bring their livestock to the highlands (I11), for example to the Namina Enkiyio forest (meaning "forest of the lost child") on the Nguruman escarpment in Loita Division) (I2). Those with larger herds migrate over longer distances. In the Ntuka Sub-Location, if there is a severe drought, herders generally choose to migrate to three main destinations: the Mau forest, the Mara conservancies, or the Maasai Mara reserve (I2). Places like Mara, Siana, and Koyiaki Group Ranches[15] have a lot of grass and provide assistance to other Maasai herders in the case of a severe drought (I11). Herders approach the leaders of these areas individually, especially if they have a very large number of cattle, like 300-400 heads. Access is free but migrants are expected to respect local rules. Social networks greatly facilitate migration. For example, someone who works in a conservancy is better able to gain access to these areas for his livestock (I6). People also migrate to wheat farms around Narok town (I2). These migrations

[15] Sixteen conservancies in the Maasai Mara are grouped under an umbrella organization called the Maasai Mara Wildlife Conservation Area (MMWCA). The Koyiaki Group Ranch has 5 conservancies which are used as grass banks (I Silantoi).

generally take place in August and September (Iteam). Below are a few narratives describing these migrations:

> During the dry season, I migrate to any place where I can find grass. For example, I can go to the wheat farms around Narok town where I may stay a few weeks or months, depending on the length of the drought. I scout the area before making a decision. I migrate with a group of 3 to 5 households. No, we are not necessarily from the same clan. We migrate as a group so that we can defend ourselves better against wild animals. We do not migrate as an entire community as some may move earlier while others delay. I may migrate alone or with a neighbour. We settle in the homes of relatives, or in temporary structures (I3).

> In the Mau forest, the Maasai Mara, and the Loita forest, we do not need to pay to access grazing resources. In the Namina Enkiyio forest, we must request access from local elders and respect local rules, like not cutting trees in the forest and not grazing in certain areas. They will also provide information about which areas pose more problems with wildlife. In the wheat farms around Narok, access requires payment. Agreements specify the number of animals that can enter the farm and the duration. Sometimes herder are pushed out because the farmer need to plow the land (I2).

Herders from the Naroosura Group Ranch also bring their livestock to the Maji Moto Group Ranch. They can rent a grazing area there, paying 20,000 KSh/50 acres if the area is not fenced, or 50,000 KSh/50 acres if it is fenced, "because then other livestock cannot enter the area." Maji Moto land owners with no livestock can survive by selling the grass of their pastures (I6). On the other hand, people from Maji Moto also come to search for grazing resources in Naroosura during the dry season, if there is more rain than in other places. While we were conducting an interview, an elder from Maji Moto arrived to make a deal in Moloroo to access pasture on behalf of a larger group. He failed to obtain an agreement and was sent to another place because another group of people, also from Maji Moto, had already arrived and made an agreement for 1,500 cattle and many shoats. Herders from the Loita hills and from Naikara also come to Moloroo to request access to pastures (I12).

This type of negotiation has always been practiced. In the past, the negotiation generally involved a group of people, like the case we witnessed. But today, if the land is subdivided, negotiation occurs between specific households or families. Those who offer their pastures gain an advantage they will then be able to access the pastures of these temporary migrants, when they themselves will face a drought (I12).

1.1.1. Livestock diseases

The main livestock disease epidemic in the recent past occurred in 1967. It had a very large impact on herders and made a significant contribution to the shift from pastoralism to agro-pastoralism, as we have seen in Section 3. We do not have precise information regarding more recent livestock epidemics, but the most severe outbreak seems to have occurred in 2009. It was the foot and mouth disease, which spread easily between cattle, killing many animals. Cattle also suffer from a disease transmitted by wildebeest.[16] Shoats suffer from a disease called *shamsham*, which means "taste-taste." According to local people, these diseases have no cure and just "come and go" (I18). Other major epidemics occurred in the 1970s and in 1997 (I12).

[16] Bovine malignant catarrhal fever (BMCF).

5.2.4. Intensification with new breeds and grazing systems

New breeds are currently being introduced because some pastoralist want cattle that can be sold a higher price and that produce more milk. Some leaders encourage herders to keep fewer cattle but adopt these more productive breeds (I11). According to the Chief of Ntuka, 10 traditional *zebus* are equivalent to 3 *Sihawal* in terms of profit. A large *Sihawal* bull can be sold for between 250,000 and 300,000 KSh, while a traditional zebu is worth only 20,000 to 30,000 KSh. Those who have already adopted the new breeds are economically better off. However, these new breeds also require a lot of grass (I11). According to I13, it is better to buy a heifer or a bull and cross-breed them with local races (I13). I13, who is also a leader in his community, explains his strategy for breed improvements:

> I own *Boran* and *Sihawal* cattle, although I am not sure whether they are pure. Both breeds are well known here and were introduced about 10 years ago. Their size can be triple that of local breeds of the same age. A four years old local bull can be sold for about 30,000 KSh while a *Sihawal* bull of the same age can be sold for 100,000 KSh. Regarding grazing, they are managed in the same way as the local breeds. *Boran* and *Sihawal* cattle don't need more water or more grass than local cattle. They have been through drought and proved that they can also walk long distance and survive with little pasture. I think that Boran and Sihawal are the best breeds as they survive everywhere and still can produce a lot of milk (I13).
>
> In 2009, I bought 3 cows of the *Arshier* breed for 30,000 KSh each, following the advice of an agriculture officer. But these cows are not productive. The agriculture officer then advised me to buy *Freshian* cattle, a breed that originates in Holland (I13).
>
> On his advice, I bought a very young *Freshian* bull 2 years ago for 70,000 KSh, at a County champion where I was invited by authorities to learn about new breeds. I bought it with my own resources, by selling some of my livestock. I am the only person here with a pure-bred *Freshian*. This breed is good for milk production but it is too delicate. It is susceptible to disease and cannot survive a drought. It does well in the highlands but not here with the drought. It is a heavy feeder and does not do well unless it is put in a zero-grazing system. Like with other introduced breeds, I will cross it with local breeds to increase their milk production. I already obtained 4-5 cross-breed heifers but they are still too young to produce so I don't yet know the changes (I13).

These stories illustrate the interest of locals in developing more intensive livestock systems. The *Sihawal* and *Boran*, once crossed with local breeds, are said to sustain long droughts and long migrations. However, more investigation is necessary to determine the suitability and economic advantages of new breeds and new grazing systems. Our informant quoted above is probably not representative of the general view since he has more resources and is able to take greater livelihood risks than the majority of the population. Typically, livestock intensification requires investment to secure sufficient forage during the dry season, by harvesting or buying hay. As long as dry season migration is necessary, local breeds may remain better suited. Moreover, in a context of increasing frequency of drought and scarcity of grazing resources, there is a declining interest in cattle and increasing interest in smaller livestock such as shoats. The promotion of larger cattle breeds that require intensive feeding runs contradictory to that logic and may not be the optimal strategy for the majority of the population. Typically, the riskier the environment, the higher the preference for smaller animals as they enable spreading risks in time of droughts and disease epidemics, since each dead animal represents a smaller loss.

On the other hand, given the increasing importance of farming and the possibilities offered by irrigation, the intensification of livestock may be inescapable because livestock and farming systems will need to

be integrated into a single system. Such integration is typically conducive to raising fewer, more productive animals, and adopting more intensive management, with reduced livestock movements and higher quality forage. Crop residues produced on agricultural land are such high-quality forages and may thus facilitate this transition.

5.3. Farming

5.3.1. Irrigated farming in the escarpment

Farming in the Naroosura Group Ranch consists mostly of growing tomatoes, onions, maize, and beans on irrigated land along the slopes of the escarpment (Block 1 in the intermediary zone) and along small streams, around Naroosura and other settlements such as in Nkimba and Motorok in the foothills of the Loita hills. Tomatoes bring in a lot of cash but are also a risky business (I17). A group of young Maasai men from Block 1 describe their farming activities:

> We grow maize, beans, and tomatoes, mostly because we get a lot of money from these crops, and we also grow onions. November and December are the months where the price of onions is highest while the price of tomatoes is lowest. Tomatoes have a high price in April and July. Maize is a staple food that we can plant any time. We really like maize. We tried rice but it did not grow well. We have not tried wheat. I don't know why. We also have arrow root [taro]. We grow a few potatoes but they don't do well. We also plant carrots but on a small scale (I18).

> When we begin farming we first consider the water source. If you have 1 acre of land far away from the water source and need to pump, your budget is 100,000 KSh [1 USD equals about 100 KSh]. If you can access water from the canal [irrigation by gravity] you will need approximately 85,000 KSh. To cultivate one acre of tomatoes, you also need to pay for chemicals, which cost about 50,000 KSh per acre. Then you must pay 6,000 KSh to plow the land and 5,000 KSh for the labour to prepare the land. Labour actually costs more than this, about 10,000 KSh, because you must also feed the workers. Seeds cost 5,000 KSh for 250 grams, which is enough for about 1 acre. Transplanting the nursery costs 10,000 KSh for labour. You also must pay 1,500 KSh to buy the hoe, the long one. The small one that is used to weed costs 600 KSh. We do the weeding by ourselves or we hire people if we have money. You cannot weed 1 acre by yourself. You hire people whom you must pay about 300 KSh per day. The size of the tomato plot depends on how much water you have and sometimes you need a machine to pump water. You pay people to spray, 500 KSh per day. How much you spray depends on how young your crop is. The young crop requires less chemicals. Chemicals go by stages. Yes, it is true that some people may spend 150,000 KSh or more to cultivate one acre of tomatoes (I18).

> A full crate of 65 kg of tomatoes is sold for approximately 1,800 KSh. The price fluctuates, and can drop to 800 KSh or increase to 6,500, 7,000, or even 9,000 KSh depending on how the market is. At 2,000 KSh and below, you may lose money. It also depends on the care you have given to the crops. If you take care of the crops very well, the costs of growing tomatoes are higher. Sometimes you need to use a generator to pump water and then the expenses are very high. It is disastrous when there are a lot of diseases and the price goes down. Then you lose money. When the price goes up you will make a profit. On average, you can earn 50,000 KSh of profit after expenses are paid. If the price is 7,000 KSh and the harvest is good, you can make a million KSh from one acre of tomatoes. In 2015 we had this. When this happens, we use the profit to expand our agricultural land, invest in a business, or build a house. No, we don't use that money to purchase more livestock (I18).

The greatest challenge is to find capital for investment. Many people don't have money to start farming. There is also a lot of risk. You just plant in faith because you don't know what will happen. You can plant tomatoes and after 2 month you may need to sell at a low price. The greatest challenge with onions is the competition since there are lot of onion farmers in Tanzania. We also have a lot of diseases, which in some cases have no chemical remedies. After finding money for investment, the next challenge is accessing enough water. If we don't have enough water, we can only plant a small piece of land, enough to help our family but not enough for doing business (I18).

The soil fertility is deteriorating. Now people have started to use chemical fertilizer. Manure fertilizer takes time to decompose. It is useful for cultivating potatoes but is very labour-intensive. We use manure mainly for potatoes and carrots. The main cause of the decline in soil fertility is the long-term use of the land. We only plant one crop on each piece of land. There is no crop rotation and we don't fallow the land (I18).

As we are living on community land [that has been in large part allocated to individual households but not yet titled], we can find new places to create a farm. We just need to ask our neighbours. Sometimes we must pay to buy or to rent the land, but sometimes it is free. This depends on the person who occupies the land. They give access to the land for free if it had never been cultivated because by working the land, you put your labour and prepare it for cultivation. Hence the owner [the person who occupies the land and may claim it on behalf of this recognized use right] benefits. We search for land in the plains too. Here where we are now, the land has already been allocated [but not titled], but in the plains this is not done yet. But we have not found good places for cultivation in the plains because there is no irrigation there (I18).

Yes, people from the plains come here to cultivate here. Two of us [there were 4 farmers in the group being interviewed] came from the plains. This is our native land. We came back because we have relatives here. If someone needs more land, they just ask for it. If you don't have relatives that can help you, for example if you come from far away, you can still go to a community where you have a friend and arrange to obtain a small piece of land. It is given to friends. However, if you don't know anybody, then you cannot obtain land. Then you just go to an urban center to find a job, or you build a house [a business] and eventually you buy some land (I18).

There are many people coming here from Tanzania and Uganda. There are even Sonjo people [an ethnic group found mostly in Tanzania]. Sometimes these people are just robbers. They pretend that they want somewhere to settle and then they just rob us. You lease them a piece land and a house to stay in and then they steal from your own family. They are not good at all. But at times you have people who are not like this and who farm and dig together with us. They come from different countries and sometimes they can live like one family. The shelters for these workers are called *Ndaky*. You can see these all around (see Photograph 13 in Appendix 3). There are many, especially in this place. These migrants don't live in villages. They live in these shelters in the *shamba* where they are working. There are people who we call champions and we pay them 100 KSh if they work from 3pm to 6pm, 200 KSh if they work from 9am to 1pm, or 300 KSh for the whole day. We also provide them with tea, water and food, which adds to our expenses. They stay a few years and then they leave. In general, they don't buy land here. They save money and go back to their country (I18).

We plant cash crops to get money to pay for school fees. I am a student at the university. The three others are also planning to go to university. I must pay 108,000 KSh per semester and there are 3 semesters in a year. Therefore, I need more than 3 tomato harvests per year, but if the

> price is high I am fine. Last semester, when we began school, we were in debt because of our fees. The tomato prices were low. Then last month the prices increased and I could pay my school fees (I18).
>
> With the money we earn from farming, we also do business with cattle. When the rainy season approaches, we can buy male cattle and then sell them after the rainy season has ended. If you can buy 20 animals from local breeds at 15,000 KSh per head , feed them, and sell them after the rainy season, you can make 500,000 KSh of profit. You feed them up in the mountain and sell them 25,000 KSh if they are well-fed. You can hire someone or have your brother take care of them for you (I18).

Other interviews confirmed or complemented this image of a relatively productive, profitable, capitalist (in general, labour and financial capital are provided by different persons) but also risky farming system. The farmers interviewed explained that if there is enough water in the irrigation canals, it is possible to cultivate the same land parcel three times in a year. For example, one can first plant maize, followed by onions and then tomatoes (I15). If the work was done by hired labourers, the cost of planting could reach 200,000 KSh/acre (I8, I15). About 75% of this amount is used to buy chemicals for pest and disease control, and the remainder (25%) is used to pay labour (I15). Land is often leased but cost is relatively low, at about 8,000 KSh per acre (I15, I25, I26). The money invested in farming generally comes from the sale of livestock (I15). The net benefit can reach 200,000 (I8) or even 300,000 KSh (I15). Maize is less risky than other crops, but is also less profitable. One household may invest 20,000 KSh to harvest 20 bags of maize worth 3,000 KSh each (I8).

Hired workers are usually Maa-speaking people from Tanzania, or Kikuyu people from Kenya (I18). Various contractual arrangements seem to exist with these workers, from the payment of daily wages to share-cropping, depending on the tasks and on the investment capacity of the Maasai land-owner. Initially much agricultural work was done by non-Maasai people. Today, it is mostly done by Maasai people, although the harvesting and loading of agricultural products for transport is still done mainly by outsiders. Maasai became more interested in agricultural work because the demand for money increased and people “have to work to get money.” They realized that agricultural work pays cash. Young men started to see that farming is less labour intensive than looking after cows, so they decided to provide labour to the farms (Iteam). Today, most young men living in the intermediary zone practice farming unless they are in school (I15).

There are several other constraints to the development of farming in addition to the high level of investment required and the high risk of crop loss owing to pest damage or water shortage. Farmers depend on brokers to sell their products. Brokers are generally young Maasai from the Naroosura Group Ranch. They tour the area on motorbikes to learn where there is agricultural production, and take a commission for putting producers and buyer into contact. They negotiate the prices of crates of tomatoes that they overfill, taking for themselves the profit from the extra weight, which can represent 30% of the product (Iteam). Furthermore, it is sometimes difficult to find buyers after heavy rains because the road becomes impassable (I14). Another issue is declining soil fertility. Farmers apply fertilizers and manure to mitigate this problem (I14). They generally prefer fertilizers because of the higher labour input required to spread manure (I18).

Farming is also practiced by non-Maasai people who live and rent land in Naroosura (not to be confused with those working for wages or as sharecroppers). These non-Maasai are from Kenya and Tanzania and appear to be backed financially by people who live in Narok or Nairobi. It is not clear where the money

comes from. These commercial farmers employ workers to cultivate between 15 to 20 acres that they rent from Maasai people. When the soil is exhausted, after 3 years of cultivation, they move to another plot. They can rent as much as 30-50 acres, at 8,000 KSh per acre if the land can be irrigated, or as low as 3,000 KSh per acre if the plot is far from the canal and a pump is required for irrigation (I26).

The growth of farming activities and the entrance of commercial farmers into the scene has created a shortage of water. I26 describes how water is managed in Kuseka, and the impact of commercial farming on water management:

> As the population was increasing, we realized we needed to better manage the water. The biggest challenge today, following the expansion of the farms, is our relation with people living down stream. Those upstream are using more water and those downstream do not have enough for their farms and their livestock. So, we now have a Water Committee in each village, and an umbrella Committee which oversees all the villages in Naroosura. It is called the Water Resources Users Association (WRUA). This is the body that addresses conflicts when there is a complaint about water use (I26).
>
> I am chair of the Committee that manages this canal. We have Committee members who visit the farms, starting in the lower part of the watershed and going upstream to those nearer the source. We have 7 Committee members doing this, [with one member in charge of monitoring the canal for each day]. We keep the same group of 7 members each week until the Committee membership is changed, which occurs every 2 years. There are 63 pieces of land along the canal, belonging to 63 households, and on average there are 8 people per household. When there is a need for maintenance, everybody contributes 200 shillings or more to buy the material or pay the people who do the maintenance (I26).
>
> Regarding maintenance and damages, we block the water and lay down some sacks to protect the canal when there is heavy rain. But we received some support from JICA [Japanese International Cooperation Agency] and our canal and dam have been cemented. Before this, maintaining the canal was difficult. The dam facilitates water management because there is a gauge to calibrate the intake of water. We are now able to manage the water following the rules set up by the Water Resources Management Authority (WRMA), which governs all water resources in Kenya. We also have a few canals that don't have gauges for quantifying the intake of water, but we work to be sure that they don't take too much water. There are 7 canals on that river and we are the third lowest: we have 4 upper canals and 2 lower canals. The Naroosura WRUA Committee is comprised of two members for each canal (I26).
>
> Almost every year, there is shortage of water if we don't have enough rain to fill the river. This shortage is caused by the expansion of farms. Some people open 7 fields for cultivation and pump a lot of water directly from the river. These are non-Maasai people, generally Kikuyu or Tanzanian. We are trying to manage this problem by reducing the use of these pumps. We have tried to implement new regulations. For instance, we had a conflict in August-September and in October 2014, when non-Maasai people started to use large water pumps. Those downstream did not have enough water and this created a lot of anger. They came and destroyed the pumps and canals. We had a meeting with some WRMA representatives and it was decided that we would allow the water run downstream during the night so that they could irrigate. We also passed a resolution saying that when the drought comes, the water pumps should not be used, and no new pumps should be used on any new farms. All accepted these regulations. We passed the resolution without the presence of those having large pumps because the *shambas* where they are farming belong to the Maasai and they are not Maasai, so they had to accept (I26).

> Yes, land subdivision may have a significant impact on water management and on these conflicts. Once the land is subdivided, parcels will be bought by non-Maasai commercial farmers, who will then be eligible to become members of the water management association. This is a scary prospect for us (I26).
>
> There are about 10 non-Maasai commercial farmers using this canal, in addition to 63 Maasai households who practice farming. We can also find commercial farmers at the ends of the canals. There are roughly 17 large pumps there, below the last canal. Some Maasai people also started to use such pumps. They did well with irrigated farming so they are scaling up (I26).

In sum, farming is already an important economic activity in Naroosura, and is the main livelihood activity for many young Maasai in Block 1. However, it requires considerable investment and is risky. There may be some potential to develop farming in the area by purchasing pumps to irrigate sites where gravity irrigation is impossible. However, currently these investments are made primarily by non-Maasai people. In a context of increasing water scarcity and demand, this may result in increasing tensions between Maasai and non-Maasai farmers. More efficient irrigation systems, like expanding the cementing of canals and adopting micro-irrigation technologies to reduce water losses, may need to be promoted, in addition to enforcing restrictions over investments in large scale irrigated farming.

Farming in Block 1 may also be developed by improving pest control using non-chemical means. The money invested in chemicals is extremely high and agronomists should be invited to assess the situation and reduce these costs, with strategies such as the adoption of new crop rotations and integrated pest management. The use of manure rather than chemical fertilizers could also reduce costs if transportation means such as ox-carts were available to reduce labour costs.

5.3.2. Farming in the plains

Small-scale farming has also been practiced in the plains for approximately 10-15 years. Farming in this area is primarily subsistence cultivation of beans on non-irrigated land. Maize is also grown, but is likely to be completely abandoned in the near future because of the increasing frequency of prolonged droughts.

In Olosirua, most families plant beans of flat land parcels located on the tops of the hill sides, generally around settlements because there are fewer stones in these areas. They plant about ½ to 1 acre of land and harvest between 3 to 6 bags [presumably of 90 Kg] of beans per acre (I31). In Paratia, if the harvest is good, a single household can harvest 50kg of beans by planting 9 kg of seeds. However, in some years there is no production at all because of insufficient rainfall (I8). Maize is also planted on a very small scale. One household in Moloroo can harvest a maximum of 15-18 bags [presumably of 90 Kg], which are sold for a price of between 2,500 and 4,000 KSh depending on the supply in the market at the time. It is necessary to invest 15,000 to 20,000 KSh to achieve this result (I12).

Plowing of fields in the plains is generally done by hand. Both men and women cultivate crops, sometimes on different plots, although they tend to operate collaboratively when they cultivate land that has been leased. Those who do not practice farming are discouraged from farming because of the risk of drought and consequent crop failure, and because of potential crop damage by wildlife, especially in places where it is difficult to find wood to fence (I8, 12, I31).

In addition to rainfed cultivation, some people also plant tomatoes and maize on irrigated land, using water collected in water harvesting structures (dams) (I8). Given the scarcity of irrigation infrastructure,

only a small number of people (about 10% of those cultivating land in Moloroo) practice this type of farming (I12). They grow tomatoes, beans, maize, and *Sukuma wiki*, a local vegetable that is related to kale. In Moloroo, irrigated farming using these dams began about 5 years ago, when the government built the largest water harvesting dam. Before this, there was only rainfed bean farming (I12). There is potential to develop farming in the plains using such dams because the soils are "not bad" (I9).

The government dams were built using a bulldozer. They required 3 months of work and are said to have cost about 3 million KSh each. The decision to construct them was made by the government. The local people did not request them. The government also introduced a pipe that transports water from Naroosura to Molooro and other villages. However, this water is not used for irrigation.

There are three government sponsored dams in the Naroosura Group Ranch, including the one in Moloroo. In addition to enabling irrigated farming, the Moloroo dam supplies water for shoats (but not for cattle because they would pollute the water) and for other domestic uses. The water is managed by a Committee and is used until the dam is empty. In certain years there is not enough water for the entire cultivation cycle and farmers lose their crops. Therefore, some people prefer not to engage in farming (I12).

The other dams in the plains are private and were constructed without support from the government. People began to build dams about 20 years ago to supply water to their livestock. There are several of such dams in Moloroo (I12). For example, in Pariata, I7 invested 500,000 KSh to construct his dam. It took him 2-3 years, hiring 20 labourers who worked for 2-3 months per year to complete the job. He built his first dam 20 years ago and gradually increased its size. He now invests about 200,000 KSh per year in farming, earning a net profit of between 50,000 and 100,000 KSh. During years when there is a drought, there is not enough water in the dam, resulting in no profit or a financial loss. However, I7 continues to farm because it enables him to pay school fees (I7). According to people in Moloroo, a farmer can earn as much as 500,000 KSh in one season by cultivating tomatoes if the harvest is good and the price is high (I12).

Because of the low rainfall and small number and size of water harvesting dams, people living in the plains have fewer opportunities to practice farming on their lands than those living in the intermediary zone or in the highlands. However, they sometimes rent irrigated land elsewhere, in Naroosura or Ewaso Ngiro, primarily to grow tomatoes, onions, and maize. They generally hire agricultural labourers because of the need to travel back home to look after their cattle (I8). Even in Olosirua, which is a community where traditional pastoralism is still well alive, a few families practice farming, by leasing land in Naroosura. These people are generally not financially well-off. They own fewer livestock than other members of their community and their decision to engage in farming is primarily to produce their own food so that they are not forced to sell their few animals to meet subsistence needs (I31).

There is a great variety of arrangements through which people access land that is suitable for irrigated farming. Some have relatives who give them land free of charge. They settle close to these fields with one of their wives. Others obtain agricultural land as part of a friendly agreement: they grant access to livestock in their pastures to people who provide them with agricultural land in exchange(I31). A minority of people sell cattle and use the money to rent land. The price for renting land depends on one's connections with the land owner. If the land owner rents land to a relative, the cost is 3,000 KSh per acre (I8), or there may be no charge. Otherwise, rent can reach 10,000 KSh per acre (I8, I12) for one cycle of cultivation. If the tenant wants to plant again within the same year, he [or she] has to pay

another rental fee (I12). People do not lease land for farming every year because it is difficult to find land that is available to rent (I8).

5.3.3. Farming in the highlands

Farming is also practiced in the highlands. The main crop in highland areas is rain fed maize, which grows well and generates significant income if cultivated over several acres of land that is plowed by tractor (Photograph 20 in Appendix 3), or if cultivated on land newly cleared from the forest (Photograph 21 in Appendix 3). I20 and I23 describe the current situation of farming in highland areas. They explain that although farming is very attractive, the community continues to rely on livestock and limits the expansion of farming to conserve sufficient pastoral resources:

> We rent a tractor to plow for a price of 2,500 KSh/acre, but some people still use the ox-plough. These changes [from manual farming to using the ox-plough and then the tractor] significantly increased agricultural production. With manual cultivation, one can cultivate only 1 acre and produce about 30 bags [presumably of 90 Kg] of corn. When we began using oxen for ploughing, we increased the cultivated area to 3-5 acres [per household], producing about 90 bags of corn per 3 acres. At the time, the land was fertile and the ox-plough was able to prepare 1 acre in 4 days. Today the tractor can even plow 4 acres in one day and it turns the soil nicely. However, we passed a bylaw that prohibits any individual household from clearing more than 5 acres. A household is comprised of a married man along with his wives and children, regardless of the number of wives. If a man is polygamous, he can have 5 acres in total for all three wives. If we allow more expansion than this, there would not be enough grazing land for livestock. Therefore, acreage ranges from 1 to 5 acres depending on household size (I20).
>
> We could keep more livestock after we had adopted farming because we no longer needed to sell them to buy food. We also gave food to the people from the plains because they did not farm. These were our uncles and brothers and sisters, and we gave them some food for free or they came to buy food from us. Now, some people from the plains have moved here to do farming. You can see their farms down the slope. People living in the plains often have another *boma* elsewhere where they practice farming. It has become difficult to find land for farming, even for the young people from our community. But we accommodate them because we must (I20). However, it is not always easy. There are polygamous families and a man may have 10 sons who need to clear new land to practice farming. They try to clear land close to the forest, but the forest needs to be protected (I23).

Farming in the highlands has great potential. However, this has led to considerable pressure on the land and forests. Most farmers cultivate corn, which does not generate as high a profit as tomatoes in irrigated areas but is also less risky, requires less capital investment, and can be practiced at a larger scale using ox-ploughs or tractors. It seems that a rush for land is about to happen or already started. People from the plain want to seize the economic opportunities provided by farming in the highlands. According to one of our team mates, some young people establish farms to cultivate maize and beans, as well pastures for their livestock, on the edges of the forest, against the will of leaders and elders.

5.4. Other economic activities

In addition to pastoralism and farming, some households have diversified into other livelihood options, including small businesses and handicrafts like bead work. These were not investigated in detail in this study, but some general findings are outlined below.

Many men make money by buying and selling livestock. Women, on the other hand, buy and sell goods such as sugar, maize, or potatoes in local markets. For instance, they buy goods in Naroosura and resell them in Ewaso Ngiro, taking advantage of price differentials between these localities (I8).

In the Ntuka Sub-Location, a few women engage in bead work. However, demand is limited. This activity generates good money when there are customers but it is not a reliable livelihood strategy. The buyers are girls from the same locality who are about to get married. One woman can sell beaded products worth 10,000 KSh in one day, but then sell nothing for many months (I3).

Agricultural wage labour is also common. People who lack the capital to invest in farming sell their labour to those having resources, or collaborate with them through a variety of arrangements that we did not investigate in this study. Normally, daily labourers are Kikuyu and Tanzanian people (I18), but Maasai are also sometimes hired to do farm work (I27). In Kasiole, Maasai men and women work as daily labourers to harvest tomatoes on the adjacent Group Ranch Olenkuluo (I10).

5.5. Gender issues

In Maasai societies, women generally have a lot of domestic responsibilities. In Pariata, women are responsible for caring for the children and cattle, including spraying and injecting medication to cure sick animals. They also grow crops and carry on other home-based duties when their husbands are away. Men are often absent because they travel to look for work, to run small businesses like buying and selling livestock, to search for places to bring livestock during the dry season, or to engage in farming in places where there is enough water, such as Naroosura or Ewaso Ngiro (I8).

Women have limited power within the household. For example, I8 wanted to practice farming but could not do it because her husband did not authorize her to sell a sheep to buy the required seeds. Once married, women generally have no authority to decide on the sale of livestock. They do not inherit all the livestock from their husband when he dies, as some may be inherited by the husband's brothers. Women may receive support from their brothers and deceased husband's brothers in times of duress, but the man who supports them is also in charge of managing their livestock, so they must ask for his permission before selling animals. Widowed women are not able to freely move their livestock on community land like men can. They must first ask permission from the elders. Widows usually remain in the village of their deceased husband. However, they may need to move to their native village if they need support. In case subdivision will be undertaken, widowed women are uncertain that they will obtain some land because membership in the Group Ranch is in the name of their husbands (I3).

The situation of women is changing, partially because of education and partially because of the adoption of the new constitution (I3). In the past, according to Maasai tradition, women were not considered to be persons who had a say in decision-making. Today, education has brought greater equality and awareness about the situation of Maasai women. Women now receive more support from their relatives and also from the government (I3). Some occupy leadership positions and become members of Village Committees set up by the new constitution (I8). For example, currently in Pariata, 5 of the 8 members of the Village Committee are women (I8).

5.6. Interaction with wildlife

The area is inhabited by abundant wildlife. A wildlife corridor runs from Maji Moto through to Olenkuluo, Pariata and Kasiole, in the Ntuka Sub-Location (Map 4 in Appendix 2). In the past, wildlife

was not a problem because the human population density was low and there was enough space to avoid interactions between livestock and wildlife (see Section 4). Today, wildlife causes many troubles, preying on livestock, transmitting diseases, and killing or injuring people (I32). Our team mate from SORALO provides a history of human-wildlife interactions in the area:

> In the 1960s, there were only 2 *manyattas* in Kuseka, and rhinos were abundant like gazelles today. There were hundreds of rhinos in the hills. In the late sixties and early seventies, the government gave permits for hunting and European hunters arrived with Kenyan guides. Old animals were hunted for 'trophies.' There were professional rules to follow. Young animals were spared because of these hunting rules. However, when Africans realized that Europeans hunted wildlife, they realized that there was money to be made. So they started to kill wildlife - zebras, leopards for their skins, as well as elephants and rhinos. By the mid-seventies there were some controls placed on hunting because when the hunters arrived, poachers came too. A few years later, we realized that some elders were among the poachers. We saw them in land cruisers and coming with white men. By the late seventies, both hunting and poaching were so rampant that the government suspended the hunting block [a piece of land where wildlife hunting was authorized; hunting blocks in Kenya were abolished in the 1970s]. However, this did not stop the poaching. I was still a young man at the time. Some government officials were also involved in poaching. Poaching lasted until the late 1980s, when the government became more committed to enforcing the rules. During his second term, our second president put in place stiff penalties and introduced an anti-poaching unit into the Kenya Wildlife Services (KWS) to replace the game department. Hence, poaching was suppressed from the late 1980s to the early 2000s. During the period of heavy poaching, the human population was low with a lot of space for wildlife and livestock, so we did not have a lot of human wildlife conflict. But the population started to increase in the late 1990s and settlements expanded. We had some conflicts with lions because the traditional *moran* hunted lions. They would also hunt buffaloes for fun. These are the few conflicts with wildlife we had at the time (Iteam).
>
> In the early 2000s, the law in Kenya did not provide for compensation of any kind [when wildlife caused trouble]. KWS was not keen in addressing the conflicts between humans and wildlife, which were rampant. Therefore, by 2004-2005 poaching returned. We killed off the rhino population but we still have elephants in the forest and at the edge of the Ewaso Ngiro River. The government instituted a lot of force against poaching, but there was no clear strategy at KWS and between 2010 and 2013, we lost a lot of elephants. Communities and conservation organizations highlighted the problem to their parliamentary representatives, explaining that there needed to be a review of the Wildlife Act. We pushed the government to enact new legislations. However, there wasn't strong political will because the government was developing a new constitution at the same time. The new wildlife bill was [discussed] in parliament because of the many human/wildlife conflicts. People were fed up because the government did nothing and it took 10 years for the parliament to act. The new constitutions was adopted in 2010, and persistent lobbying by conservation groups led to the new Wildlife Act being passed in 2013, which is a year during which we lost a lot of elephants (Iteam).
>
> However, the Kenya Wildlife Service did not have a strong commitment to solving the problem. Again we started to lose wildlife along the corridor because of settlements and inappropriate livestock management. A lot of pastoral land was subdivided. We lost wildlife corridors and dispersal areas, especially in the Mara and Loita plains. Everybody wanted to live in their own area and this created conflicts between wildlife and humans. The wildebeests run through the wheat farms when they migrate, causing outcry from communities and large wheat farmers. Subdivision created many human-wildlife conflicts and reduced the land available for wildlife.

> Then, in 2006-2007, we created SORALO.[17] There was a big conference on Community-Based Natural Resource Management (CBNRM) in East Africa held in 2012. I met with the ACC[18] and SORALO in 2006. They came to work here and employed 8 scouts in Loita, Naroosura, and Elangata Enterit. Human-wildlife conflicts were rampant and uncontrolled since 2010, because animals were still moving through Group Ranches. When the new Wildlife Act was passed in 2013, we thought we could reduce these conflicts because the government was supposed to pay for damages caused by wildlife. But this provision is still not fully implemented. There are penalties against poaching but compensations for crop and livestock damage and even for human injury and death are not applied (Iteam).

Today, wildlife still has a destructive impact on farming (I3, I9), livestock herding, and the people themselves. The Chief of the Ntuka Location describes the situation (I11):

> Herbivores come from Mara and stay 3-4 months here during the rainy season. The carnivores follow them, but when the herbivores return to the park, the lions and hyenas stay here, which causes problems as they prey on our livestock. The situation is particularly severe in villages that have bushy vegetation where carnivores can hide, such as Kasiole, Olosorot, and Olosirua. 400 sheep can be killed in one month, taken by leopard and hyenas. The biggest threat is hyenas, while there are only a few lions now. There is also loss of human life, which happens when people try to protect their livestock from carnivores. Maybe 4 people get caught by a hyena and 5-6 people get caught by a leopard each year. One or two die and the others are injured. 2-3 people per year are also killed by elephants or buffalos, while 10-12 more have injuries. Elephants also damage crops. This is for Ntuka Location. Compensation is 200,000 KSh for one human life, and maybe 60,000 KSh for an injury, depending on its severity (I11).

According to one of our team mates, the worst livestock predators are hyena, followed by lions, and then leopards and wild dogs. Elephants are responsible for the majority of human injuries and deaths, followed by buffaloes and lions. Statistics on damages caused by wildlife are kept by scouts and by the KWS, which does not like to provide these numbers to the communities (Iteam). Wildebeest also transmit a terrible disease to cattle, causing many animals to die.[19] An individual can lose 30 cattle to this disease, which is locally known as *Enkati*, meaning 'wildebeest' in Maa. The disease is transmitted during the season when wildebeest give birth, and there is no treatment (Iteam).

Normally, communities and individuals are supposed to receive compensation from the government in cases of wildlife damage. But this is not put into practice. There is a compensation Committee at County level, but nothing has changed so human-wildlife conflict is still rampant (Iteam). Communities take action by themselves. They poison wildlife by poisoning a dead cow and leaving it for the carnivores to eat (Iteam). There have been a lot of wildlife poisonings, in Pariata, Kasiole, Olosorot, Olosirua, and Nguiba. People do this because there is no assistance and no compensation from the government. There is normally compensation for human losses, however compensation for livestock losses was only provided in neighbouring Kajiado district (I11).

[17] South Rift Association of Land Owners.
[18] African Conservation Center.
[19] This disease is the Bovine Malignant Catarrhal Fever (BMCF)

6. Governance

6.1. The governance system according to the new constitution

Since the adoption of the new constitution in 2010, Kenya has been divided into 47 Counties, each of which is subdivided into Sub-Counties, Divisions, Locations, Sub-Locations, and Villages. Counties are run by local governments with elected leaders to whom significant power has been devolved. Sub-Counties are relics of the former administrative system. They used to be called districts and may soon be eliminated. Locations and Sub-Locations are headed by Chiefs and Assistant-Chiefs, who are appointed and paid by the state. According to our team mate from SORALO, these administrative units are also relics of the former constitution and should soon be dismantled following a law recently passed in parliament. Sub-Locations are divided into Villages ruled by Committees whose Chairman, referred to as the "Village Elder" although he is not necessarily an old person, is chosen by the population. The choice is then agreed upon by the Chief or Assistant-Chief, who may also influence election. Village Elders are formally recognized by the state (they carry a badge), although they are not paid and their roles and functions are not yet clearly defined in government regulations (Iteam). The Village Elders sit on Sub-Location Councils, and some of them also sit on Location Councils and Division Councils. Villages are further divided into groups of "10 *bomas*" called *Nyumba Kumi*, also headed by a Chairman, who mostly play a role in security.

6.2. Local governance institutions at the Village level according to our interviews

The information collected on the ground is generally consistent with the general portrayal above provided by our SORALO team mate There seems to be variation and ambiguities regarding who has the most influence in decision making at Village level, though. We describe below the roles played by village institutions according to our informants on the ground:

Several institutions collaborate to varying degrees in decision-making at the Village level: the Council of Elder, the Village Committee, the Group Ranch Committee, and the Chief and Assistant Chief (I24). The relative influence of each institution and individual varies depending on the type of issue being addressed and the locality. But the key decision-making institutions for daily decisions at the Village scale are the Council of Elders and the Village Committee (I8, I10), also called 'Peace Committee' (I11). The Chiefs and Assistant Chiefs are called in as a last resort when agreement is difficult. The Group Ranch also has a great impact on decision-making by orchestrating the subdivision of land (see Section 6.4.).

The Council of Elders is involved in solving internal conflicts within the community, regarding relations between and within households. It is also involved in managing access to grazing land and other resources. This role is often undertaken jointly with the Village Committee. The Council of Elders is a fuzzy institution whose members cannot easily be defined, as they vary depending on the type of decision being taken. Elders from specific *bomas* make collective decision on issues that are relevant to this group of *bomas.* Different issues may require gathering elders from smaller, broader, or simply different groups of *bomas*.

The Village Committee was introduced by the new constitution about 2 years ago (I10). This Committee does not have a flexible composition like the Council of Elder, and its members are formally recognized by the government. They hold authority to rule within the Village, which normally has fixed boundaries.

The Village Committee is led by a Chairman (the so-called "Village Elder") nominated by the community during a Village meeting (I2, I8, I10) that is chaired by the Sub-Location Assistant Chief, who then approves the nomination (I2). The Committee works under the authority of the Location and Sub-Location Chiefs (I8). It may include women and It is not limited to older people (I8). There are efforts to include both young representatives and elders so that they can share ideas (I29). The members are chosen by the community, based on their characters and experiences, while age set and stage of elderhood may also be taken into consideration (I13).

The Village Committee is formally recognized by the government. Its Chairman is given an official card or badge (I10, I29). The responsibilities of the Village Committee include: settling disputes between community members, controlling misbehavior, investigating new settlers, welcoming visitors, negotiating peace agreements in cases of conflict, bringing children to school if they refuse to attend, reporting to the Group Ranch leadership in cases of conflict (I8), and managing access to grazing resources (I10). If the Village Committee cannot settle a conflict, then the case is brought to the Sub-Location or Location Chiefs (I10).

There are various perceptions about the Village Committee but these are generally quite positive. I10, for instance, argues that the Committee has more power than the Council of Elders to settle disputes and make judgments; is concerned about the development of the area; is able to solve problems of alcoholism, an issue that was ignored by the elders; and holds responsibilities that the Council of Elders did not, such as supporting the building of the school and raising funds for children who cannot afford school fees (I10). In the neighbouring Group Ranch of Maji Moto (see Research Scoping Report #3), several informants argued that the Village Committees greatly improved local governance because before they existed, the Chiefs and Assistant Chiefs, who are chosen by the government rather than by the community, had more influence on community decisions and sometimes abused of their power.

Village level institutions play a great role in grazing management. Neighbouring Villages may make joint decisions to manage a shared grazing area, as in the cases of Pariata and Ilngarrooj Loontuka, and of Ntuka and Kasiole, in the Ntuka Sub-Location. This reduces the livelihood risk caused by insufficient rain because livestock can be moved to the Village that has experienced better rainfall (I2). In cases of severe drought, elders from a larger number of Villages communicate to identify places with more grass and decide upon joint access. This flexibility is of paramount importance for managing rainfall uncertainties. It is not clear to what extent Village Committees are also involved in these negotiations.

In cases of acute drought, which force longer migrations of livestock to areas outside the Group Ranch, requests to access grazing resources can be made individually, by small groups of herders, and also (albeit rarely) by the whole community. Different people in the same Village may choose different destinations for migration. Requests to access pastures are directed to community elders, conservancy managers or private ranch owners. They are normally accepted if the person or group making the request respects local rules such as not cutting trees, not making charcoal, not burning the forest and not killing wildlife. In case of severe drought, communities may refuse access to herders from elsewhere in order to conserve their resources for their own herds (I2). Village Institutions do not necessarily play the main role in making these agreements. The political connections of an individual or group may also influence the outcomes of the negotiation process.

Clan structures do not matter for access to grazing resources at the Village scale. All clans of the same Village share the same pastures, even though some clans may be more represented in certain Villages.

When herders search for pastures far away from their homes, clan structures matter more as people establish closer connections with their peers from the same clan (I2). Quite often, one clan is more represented in a Village because of the history of settlement. Individuals who settled more recently may have weaker clan representation. It is nevertheless possible for them to be promoted to a leadership position (I6).

6.3. The collapse of the traditional governance system

The influence of the Council of Elders varies significantly from place to place, but appears to be decreasing overall in response to the adoption of the new constitution and the creation of Village Committees, the development of farming, and in anticipation of land subdivision. Land subdivision tends to be opposed by the elders but welcomed by the young generation, which is well represented in Village Committees. The shift of power from the Council of Elders to the Village Committee is ongoing and advances at a different pace in different Villages. Depending on the locality and the issue being addressed, the two institutions may overlap, collaborate, or compete with each other. In Kasiole, normally only the elders are eligible to make decisions about access to pastures because young men "do not have enough knowledge about the land." But since the new constitution was adopted, grazing pattern are managed by the Village Committee, which now has more authority to make the final decision about grazing. Grazing rules are still decided by the Council of Elders but the Village Committee wants to change these rules to satisfy the demand for land subdivision that is supported by most members of the community (I10). In the highlands of Osupuko Oiribi, the distribution of land to young men who want to farm is managed by the Council of Elder, but the Village Committee also plays a role by making sure that the water sources and livestock corridors are maintained. Chiefs can also intervene in cases where someone breaks the law (I23). In the Ntuka Sub-Location in the plains, decisions about grazing management are taken by men during Village meetings with both institutions present, and the elders and the Village Committee Chairman have the most influence (I2). Alternatively, the Council of Elders decides on grazing rules, while the Village Committee is asked to intervene when someone does not respect the rules. In other places, the elders have already lost their influence (I8). These results should be taken with caution though. Informants may describe either governance as it functions or as it is supposed to function, and the two may differ.

Young men are often blamed for the collapse of the traditional governance system. Elders argue that there was more discipline in the past when they were responsible for decisions (I29). Educated young men tend to ignore or reject the rules established by the elders (I2). In Pariata, the involvement of young men in decision-making has led to poor choices. It is "like if they decided to die" (I5). Young men may refuse to preserve a grazing area for the future, because they want to use it immediately. This exposes them to curses (I5). According to the elders, the young men allow more livestock on the land than it can sustain. They don't respect the grazing patterns and ignore traditional knowledge. Simple rules like cutting tree branches rather than entire trees are no longer respected (I2). The collapse of elder authority varies greatly from one community to the next, but seems to be a general trend at County level. A customary elder asserted that a man who is young, educated, rich and a good speaker can attain a top position in the County assembly and sit beside a very old man, and that this leads to poor decisions (I13).

This situation reflects a conflict between different generations that has implications far beyond the issue of land subdivision. Some elders say that they have "fought so much with this young generation", which

desires freedom to occupy the land, fences any location, makes a farm anywhere, and even sells grass. Young people claim that the land is theirs and that they want to settle anywhere to practice farming even if they have no cattle (I29). They don't want to listen to their parents' and elders' advice. They influence decision-making, leading to poor decisions. They don't want to look after the cattle or migrate with the cattle during droughts. They even steal cattle from other people. The main reasons for their behaviour include the attraction of money, the disappearance of customary Councils of Elders, and the development of towns and schools where young men are exposed to other influences. Since the introduction of education, the young "say to the elders that they know nothing" (I5).

6.4. Land subdivision

Since 2008, neighbour Group Ranches engaged in a process of land subdivision (Iteam). Naroosura now wants to take this same path. The land is to be divided by giving an equal share to each Group Ranch member (I32). The process has already begun in 11,000 acres of the irrigated area (Block 1). It will start later on the remaining land (Block 2), where pastoralism is the main form of land use (I24). Most Group Ranch members expect to be allocated two pieces of land: one in each block, or one in the plains and one in the highlands.

6.4.1. Subdivision in Block 1 (irrigated land in the intermediary zone)

Irrigated agricultural land in Block 1, in the intermediary zone, was allocated to individual households a long time ago (see Section 4). These individually-owned land parcels are not formally titled but are recognized under the local customary system. There are cases of land sales, although the buyers are generally people from within the Group Ranch. Land rental is a very common practice (I24).

The legal subdivision of land in Block 1, with the goal of granting formal individual land titles , began in 2014 under the supervision of the Group Ranch. The process is still ongoing. 1,742 members, out of a total of 6,000, are eligible to receive a title in Block 1. The subdivision is managed by a demarcation Committee which has representatives in each Village (Iteam). These representatives coordinate the subdivision process and show members the location of the pieces of land they are granted (I24). For example, in Oloirwua 300 members out of the 500 people who live in the Village are eligible to receive agricultural land. Those who are not eligible are people who did not receive land when it was originally allocated by customary leaders for the development of farming (I24).

The land parcels that are being allocated by the subdivision Committee are not necessarily located in the same place, do not necessarily have the same size, nor do they have the same boundaries as the land parcels formerly recognized as individual properties under the customary system. Before subdivision, the area of farmland per household ranged from approximately 1/4 to 10 acres. However, the subdivision process is committed to a more egalitarian outcome. Households will be granted between 2-3 acres, meaning those who cultivated more land than this before subdivision will be unhappy (I24). Since 2-3 acres is less than one is expected to receive in average after all the Group Ranch will be subdivided, recipients of these titles are eligible to receive another piece of land later on, in the plains in Block 2 (Iteam). One informant, however, was under the impression that property boundaries would not change with the allocation of irrigated land (Iteam), which may reflect variations in the approach from one community to another, or an ongoing debate about which approach to adopt.

The first step in the subdivision of farm land is "biting". "Biting" refers to the process of defining land boundaries and then putting some markers on the *shambas* [cultivated fields] to physically divide the land. The second step is assigning a number to each land parcel, and the third step is providing a title for each number. After this is completed, the members must pay 36,200 KSh to obtain their title. Once a minimal percentage of people have paid their fees, they will be shown where their shares are located (I24). At the time of this field work, biting and numbering had been completed in Oloirwua, but only 20 people had paid for their titles because of difficulties in accessing money. Those who paid did not yet know where their land is located because the minimum number of paid titles had not yet been reached. However, they have the title deeds themselves (I24). In Kuseka, demarcation of the land has been completed but only 25% of people have paid the title fees. In other Villages, the process is ongoing, but it appears that few titles have been issued (Iteam).

Land that is currently not irrigated and not farmed, such as parcels adjacent to those already cultivated, will not be demarcated and allocated. Land that is cultivated using water pumps, such as the parcels located above the canals, will not be allocated either (I24). They will remain under the current tenure regime (they will not be titled).

Perceived risks associated with subdivision of farm land include (1) reduction of land available for livestock if people who decide not to farm their share sell it to others who want to expand their farms; (2) lack of access to land for the next generation as it is currently too young to receive a share; and (3) conflicts between tribes because some land will be sold to non-Maasai, which will cause divisions during elections. Many Kikuyu and Kisis who run small shops in Naroosura town are renting land from the Maasai for farming. After subdivision, they will likely buy land from the Maasai (I25).

6.4.2. Subdivision in Block 2 (highlands and plains)

We did not collect much information about the impact of subdivision in the highlands. The main impact is likely to be land booking, which will be discussed later in this report.

Land subdivision in the plains, where pastoralism prevails, did not start yet and is much more controversial than in Block 1. It is generally opposed by elders and welcomed by younger people.

In Kasiole the elders rejected subdivision, arguing that people would no longer be able to raise many livestock once the process is completed. However, they were forced to accept it (I10). According to I5, who owns many livestock, the subdivision "is just a mess" and will "finish cattle in the community," because the small piece of land that will be given to each household will not be enough to support 500 cows (I5). Subdivision is expected to reduce the mobility of cattle because of fencing of individual plots on formerly communal pastoral land. One elder went to Mara recently and saw that people were rapidly constructing fences around their plots, but then pulled them down once they realized that fenced land is not suitable for livestock management (I31). According to the Chief of the Ntuka Location (I9), subdivision is frightening and people are worried about it, but they still want it because it has been done in other Group Ranches in the area. The Chief contends that pastoralists will have a difficult life after subdivision and may need to move away to find alternatives, unless new knowledge, good planning, and explanations about how to use the land are proposed by experts (I9). Good planning for the Chief implies having livestock and farming in different places and preserving some grassland for weak animals, like people do in Maasai Mara. Subdivision also creates disputes because "if you cannot feed your cattle on someone else's plot, then you will fight" (I5).

The young generation wants subdivision because they want to sell the land to make money, as occurred in the Maji Moto and Olenkuluo Group Ranches. Once people sell their land, neighbours may be required to pay to graze their cattle on the plot (I5). Some people argue that subdivision is good because it enables the establishment of permanent structures, like houses or dams, and the development of businesses without interference from other people (I8). In Moloroo, our informants anticipated that subdivision will hasten the ongoing shift from collective to individual negotiation for access to grazing resources in neighbouring communities. They consider this as an advantage because once such individual deals are arranged, nobody else will be able to intervene (I12). In Kasiole, middle-aged men argue that subdivision will facilitate the preservation of pastureland to better prepare for prolonged droughts. If all pasture land can be accessed, it becomes depleted or "finished." Other advantages identified include greater independence in decisions to facilitate construction of permanent modern houses, and a new legitimacy to prohibit migrants from grazing animals or settling in the area. When the land is communal, one cannot stop new migrants (I10). It could be argued that these perceptions are the result of propaganda campaigns supported by advocates of subdivision. Meetings dealing with land demarcation certainly influenced the view of people. However, these statements also appear to be anchored in first-hand experiences. Our informants in Kasiole are neighbours of the Olenkuluo Group Ranch, which was already subdivided. They have relatives in Olenkuluo and their livestock continue to graze there, showing that some mobility across Group Ranch borders is still possible after subdivision. People of Kasiole have observed their neighbours planting grasses, cultivating the land, and preserving grass in case of drought. However, they are equally aware of the possible negative impacts of subdivision, as they have visited Maji Moto where a lot of land was sold after subdivision. They suggest that such land sales could be avoided by adopting a law that makes it mandatory to obtain family agreement (from spouses and sons) prior to selling the land (I10). When asked about whether subdivision should be implemented on all land or only on some land, they argued that all the land in the Group Ranch should be divided equally between members, reflecting that they perceive more advantages than disadvantages (I10).

The question of whether only some land or all land should be subdivided is an important one and is not yet settled. In Moloroo, our informants argued that the good land should be subdivided so that everyone receives a parcel, while the stony areas should remain communal. But they did not anticipate the Group Ranch to adopt this approach (I12). According to the Chief of the Ntuka Location, the land which cannot be cultivated, such as the rocky hills of Kasiole, should be set aside and not subdivided. However, he believes that subdivision has advantages even on land not suitable for cultivation. For example, individuals can preserve grass on such land and then sell it as forage (I11), a statement that was also repeated many times in the neighbouring Group Ranch of Maji Moto (see Research Scoping Report #3).

Another question is whether people should receive full individualised property rights sanctioned by land title, or simply usufruct rights to individual land parcels. In the Ol'Kiramatian Group Ranch, the latter option was adopted and only farm land was subdivided, with only usufruct rights being allocated to individual households. The remaining land was kept as communal land. When one informant was asked for his opinion about this approach to subdivision, he explained that it is great that the people of Ol'Kiramatian have been given assistance and are not allowed to sell their land, and compared their situation to that of Oloitokitok [which is near the Amboseli National Park], where some people have sold

their irrigated land, as well as their land within the conservation area, and are now forced to live on marginal lands (I10).

Another issue affecting land subdivision is the influence of politics. Poorly managed subdivision may give rise to many complaints, as was the case in the Group Ranch that neighbours Kasiole, where subdivision was halted and re-done a second time (I11). Politics has been the main cause of poorly managed subdivision in Maji Moto, where a Group Ranch leader wanted to become Member of Parliament (I11). In another Group Ranch, the first demarcation Committee was dissolved for wrongdoing and a new one was created (I14). Subdivision is often affected by political favoritism, with a certain side of the community being favored over the other (I17).

6.5. Land individual appropriation by booking and enclosure

6.5.1. Land booking

The shift from collective to individual property rights did not begin with the subdivision process. As described earlier, property rights were allocated to individual households in the irrigated agricultural area when people first started to farm the land in the 1960s. In the pastoral area, we also observed a general tendency to shift from collective to individual property rights. This process, called “booking,” may be occurring in anticipation of the subdivision planned by the Group Ranch, but may also have occurred independently of the subdivision policy. Individualised property rights may have been triggered by population growth and resource scarcity. This process also occurred in the Loliondo district of Tanzania (see Research Scoping Report #4, where the government does not have a subdivision policy and does not allocate individual land titles.

‘Booking’ is the term used to describe the appropriation of land by individual households before subdivision happens. They hope that the demarcation Committee will then allocate them the specific land parcel they “booked.” People living in the irrigated farming area in the intermediary zone and who own a lot of livestock book land in the plains to secure access to rainy season grazing resources. For example, if a man has 4 sons in the Group Ranch register, each will search for a piece of land in the plain where they will establish a temporary settlement and bring their shoats, so that when the demarcation survey is conducted, the father will keep his land in the irrigated area while the sons will receive titles for the land they have “booked” through temporary residence and grazing of shoats. Then they will be able to pool their resources together, providing access to both agricultural and pastoral land (It, I32). People from the plain, on the other hand, book land that is suitable for farming and dry season grazing in the highlands (I17). They do this especially when they lack land suitable for farming and bean cultivation in the plains (I11). According to some informants, booking is not a very common phenomenon (I17). Our impression was that it is widely practiced although not always welcomed by the authorities.

Booking is practiced in the home Village of the individual or in other Villages, taking advantage of family connections or friendships to provide access to land. For example, in Moloroo, people from outside the Village are not allowed to book land within Village territorial boundaries. These boundaries were defined when the Villages were created, and in Moloroo they are respected (I12). This is also true of Olosirua, where the traditional leadership has remained strong and where the elders still play an important role in Village decisions. Here also, booking can only be done by people from within the community. The elders support booking to facilitate land allocation and avoid conflict when the

demarcation is implemented. Since there is only one source of water in the community, the elders are careful that this remains a communal resource, so this area cannot be booked. This rigorous control over booking land has generated respect and harmony in the community, and Group Ranch officials who visited Olosirua instructed other Villages to follow their example (I31). In Kasiole, most people want to settle on a nice individual plot, hoping to receive this parcel of land when subdivision is implemented (I10). The Village Committee hopes to modify the grazing patterns set up by the elders to facilitate the subdivision process (I10). However, since Kasiole does not have much good pastureland for keeping livestock, it is even difficult to find a good spot to keep weak animals (I10). People from Kasiole thus also book land in neighbour Villages. To do this, they negotiate to be shown a piece of land, then they build a fence and start to grow beans, with the hope of receiving a title when subdivision is implemented, even though they are not from that Village (I11). People from Olosorot also do this (I11). According to the Chief of the Ntuka Location, this does not cause conflict because those who are booking first ask for permission from the Location Chief, who then sends them to visit the elders and authorities in places where land is available (I11).

6.5.2. The privatisation of *olokeri*

Booking generally involves pieces of land that have the best resources during the dry season, which are typically small areas suitable for farming and/or for creating an *olokeri*. An *olokeri* is an area of land that is used to feed sick animals, calves, and lactating cows during the dry season. It is less prone to drought and has good grass. The outcome of booking is the creation of a private *olokeri,* in addition to the establishment of a new farming settlements.

In the past, *olokeri* were collectives (I31) or existed on a scale of about 3 neighbouring *bomas* (I8). This is still the case today in many places (I6). However, currently people want to enclose land for a private *olokeri.* They may not even be required to ask permission (I6). We observed this process in Pariata for example (I6, I8, and Photograph 4 in Appendix 3). The enclosure is accepted (I6, I8) so long as the individual appropriates no more land than is tacitly tolerated (I6). In Ntuka, people said this process began about 3-4 years ago. With increasing populations, people prefer to secure some grazing resources in the vicinity of their *boma* to avoid walking long distances to find grazing resources for weak animals (I9). However, conflicts arise from such enclosures if an individual appropriates more land than the accepted local norm, because this constrains the resources of neighbouring settlements for their own weak animals (I6). In some places, elders appear to have retained greater power over individual and collective decisions and must be consulted prior to the establishment of a private *olokeri* (I31).

This change in property regime has implications for the development of farming. If one household wants to establish a private cultivated plot close to a neighbour's *boma*, it may obtain agreement to proceed. However, there is a perceived risk that the owner of the *boma* could later claim the plot that has been prepared for cultivation, which would be a great loss for the farmer if he had invested in irrigation infrastructure (I8). In addition, communal *olokeri* tend to disappear in areas where there is a lot of farming, such as in the Naroosura Sub-Location. Although communal *olokeri* existed in the past, today people maintain *olokeri* on a piece of land adjacent to their *shamba* (I13). These private *olokeri* may be fallow land that is cultivated once every few years.

This shift from collective to individual property rights for land and resources has also been observed in other regions in the world, such as in agro-pastoralist societies of south-west Madagascar (Box 1).

Box 1: Individual appropriation of pastoral resources in South-West Madagascar (From Goetter and Neudert 2016)[20]

In south-west Madagascar, the Mahafaly people depend on a native tree called *samata* (*Euphorbia stenoclada*) to feed their livestock during the dry season. They cut branches and chop them into small pieces to feed their cattle. *Samata* grows in natural forests or bushy fallow areas that are managed collectively. Any member of the community is allowed to cut *samata* branches so long as they respect local rules, such as not cutting the upper branches to avoid the death of the tree. Over the past few years, *samata* has become a scarce resource. Herders have reacted by privatising the resource using a variety of strategies. One such strategy involves claiming private ownership of the *samata* trees that surround an individual's private coraal. This appropriation is contested by other community members and debates take place in Village assemblies to decide whether the practice should be accepted and how wide a band of private *samata* trees surrounding the corrals should be allowed. Eventually, after several attempts by villagers to curtail this practice completely, privatisation of *samata* trees obtained social acceptance. This illustrates that changes in property regimes that occur in response to resource scarcity or livelihood changes are gradual, fuzzy, and contested.

The notion of private property is indeed a fuzzy one. In principle, pastoral land around settlements is collectively used. In practice, the pastoral land surrounding an individual dwelling is used in priority by the livestock belonging to that household (I6). Bringing one's livestock close to someone else's settlement is considered inappropriate behaviour (I6, I8). When a herder moves his or her livestock from one place to another, he or she needs to pass in between two *bomas* to avoid offending the neighbours (I6). It is not clear if these norms were established recently. Some argue that they emerged over the last 25 years in response to increasing local desires for private pastures (I8). Others say that these norms have always existed.

7. The case of Purko settlements in Morijo Location, Loita Division.

7.1. Overview

There are four villages of Purko Maasai settlers in the Morijo Location of the Loita Division, and area that is primarily inhabited by Loita Maasai. These settlements include Osupuko Oiribi and Ole Mengili, which border Naroosura and are located on top of the Loita hills; and Oltarakuai and Kirtilikini, which are located farther south within the Morijo Division (Map 3 in Appendix 2). These Purko villages (not capitalised here as we are not sure whether they are even recognized as Villages in an administrative sense) are not part of the Naroosura Group Ranch, with possibly the exception of Ole Mengili. The villages all have strong links with Naroosura because their inhabitants belong to the same Maasai section (Purko). They use grazing resources in the ranch (I22a) and many were already members of the ranch before the boundary between Morijo and Naroosura was drawn (I23).

These four villages are organized into an association (called Olkonyil, see Section 7.3) with the hope that this association will be granted rights to manage land and resources, emancipating them from Loita authorities. A fifth Purko village may enter the association soon (I22a).

[20] Goetter, J.F. & Neudert, R., 2016. New rules are not rules: Privatization of pastoral commons and local attempts at curtailment in southwest Madagascar. International Journal of the Commons. 10(2), pp.617–641.

These four villages lie within an area that has significant conservation value. There is a vast forest (the Naimina Enkikyio forest, or "forest of the lost child") on the Nguruman escarpment, surrounded by a mosaic of pastures, cultivated fields, and forest fragments. This forest is critical for protecting the watershed of a number of rivers; the Kanunka River that runs to Ol'Kiramatian, the Entosopia and Orobototo rivers, the Pakase River on the southern (Loita) side of the forest, and the swamps of Shompole and Natron. Approximately 10% of the forest is suitable or accessible for grazing, the rest being too steep or too dense to offer forage to livestock. Livestock grazes only on the few open hills, such as areas depicted in Photograph 18 (Appendix 3). This leaves considerable space for wildlife (I22a).

According to I22a, the forest is of critical value to wildlife conservation. It provides home to much wildlife, including many species of bats and large birds, as well as elephants, lions, leopards, and buffaloes. There are few primates with the exception of colobus monkeys and baboons. Two groups of elephants of at least 7 and 15 individuals each were seen recently. There may be 5 elephant families in total in the area at any time. In the past, the area was home to many rhinos, however these have been heavily poached and only a few remain. The population of leopards, estimated based on hidden camera traps, is higher than expected, and the number of lion is increasing. A predator expert from Mara who analysed wildlife data collected in the area said that, within the exception of the low rhino population, it is a rich ecosystem. In the past there was also a lot of elephant poaching, mainly between 2012-2013. Hundred elephants were killed on the northern side of the forest, and many more on the southern side, including in Tanzania. Loggers have also been cutting trees in the area. KWS does not help with enforcing conservation regulations because they have no money and "are on their knees." In the past, someone could call KWS if there was a problem and a vehicle would be sent, but now, "nothing is operating" (I22a).

The northern part of the forest is considered Purko land, while the southern part is Loita land. The boundary between the two areas is approximately where the forest reaches the Steyn private ranch in Ol'Kiramatian (see Research Scoping Report #1). This traditional border has existed for many years. The forest also shelters an ecotourism camp that was established by Robert O'Meara, a Kenyan of European ancestry. The land where the camp is located is not titled but has an allotment letter. The camp has been registered by the Narok Council as a tourist facility since 1976 under the name of 11 local Maasai land owners. It was dormant for several years until Robert O'Meara reactivated it by obtaining a lease and making an agreement with the 11 Maasai members (he is not included as a member). The camp supported the community by establishing a solar power borehole, a school program, and a beehive project (Iteam). It can be reach by a road going that is passable by four-wheel drive vehicles (I22a). Some land around the camp has been demarcated and livestock are prohibited from grazing in the area as this would disturb the ranch's guests.

The Purko people in these four villages raise livestock and practice the farming systems typical of the highlands (see Section 5.3.3). Livestock grazes in the vast plains south of the Loita hills during the rainy season, and on the hilly slopes and in the forest during the dry season. During the rainy season, livestock from Purko people are not permitted to graze in the Loita section of the forest and vice-versa. Boundaries were set in an agreement that was made a long time ago. However, in times of drought, livestock are allowed to graze on both sides of the borders. The forest always has enough grazing resources and the Purko never move their livestock elsewhere during droughts. Sometimes, they must move their livestock out of the forests, but because of disease epidemics rather than shortage of forage resources (I23).

7.2. Social challenges: conflicts between the Purko and the Loita Maasai

Conflict between Purko and Loita people is a serious problem in the area. The day before our visit to Ole Mengili, 40 Loita people had climbed the hill to reach the locality, followed by more people equipped with firearms and spears. Their purpose was to claim rights over a piece of land. Authorities sent a delegation and there was no fighting. Talks have since taken place and the situation has calmed down. The Loita people have returned home, but they avowed that if Loita Maasai settle in their territories, they will return, settle and farm Loita territory. The leaders of Ole Mengili are waiting for feedback from the County government, which was consulting about the issue at the time of this study. They had visited the Divisional Officer of Loita Division to decide on a suitable place to hold a meeting. (I29). The following story, provided by a Purko elder, offers an analysis of the causes of the conflict:

> The background of this, the main cause of the conflict, is that we are from different communities. The place here is for the Nihongi people who are Purko Maasai. But we are in conflict with the Loita people. We live in the highlands and they live in the lowlands. The highlands are more fertile so the Loita would like to grab our land. And we say no: don't come to grab our land. The place they want to take is the one that we set aside a long time ago for our weak animals. It is also used for shoats. From Morijo to here there is a long distance. They are very greedy and want to grab a large area. They have a lot of educated men and they take advantage of this. They have many government officials so they try to oppress our community because they think we are weak and that they can take everything. They are planning a war and they have some fire arms to attack our community. We've tried to call upon the Chiefs from different areas to come and mediate the conflict between the two communities" (I29).

Other informants explained that the Purko and Loita used to raid cattle from each other (I22a). Their conflict has existed for a long time, although nobody has been killed apparently. Once someone established a settlement in the disputed area and the government decided to burn the *boma* to make the area into a neutral zone (I29). Currently, the Purko people want to visit the office of the governor and make a request for having their own Location and Chief. They are asking SORALO for support to follow up on this proposal. They repeated this request several times during a meeting we attended (I22b). They want to be independent, to have their own government, and to set up their own Location with their own Chief. They complain that the government in the Morijo Location does not support their development. The governor has already promised that the Purko will eventually be granted their own Location and Chief. This crisis was severe enough to be covered on the Kenyan radio.

7.3. The Olkonyil association

The Olkonyil Assosiation is a key stakeholder that plays an important role in determining the future of these Purko communities in the Morijo Division. It was created with the assistance of Robert O'Meara (see previous Section). The association represents the four villages where Purko people are settled in the Loita Division and along the border between that Division and the Naroosura Group Ranch. Each of these four villages has a representative in its Committee (I21). Olkonyil has been registered and has a constitution. It main aim is to "improve welfare through good management." Olkonyil has been collaborating with SORALO to develop a land-use plan. The existence of this plan will facilitate the commitment of donors to support development and conservation programs in the area. Obviously, the future of O'Meara's camp is linked to the activities that this association will conduct. Below is a presentation of the main purposes of Olkonyil, as explained by its initiator, Robert O'Meara:

> My father was a professional hunter and one of the men in our association was his guide. They said they would see 1-2 rhino every time they went to the forest. Now rhinos are rare (I22a).
>
> The traditional knowledge associated with growing maize supports the practice of slash-and-burn cultivation. The aim of the association is to improve agricultural practices in order to reduce pressure on the forest. The fact that the forest is deeply respected traditionally is an asset for achieving this (I22a).
>
> The association looks for funding to promote more intensive forms of farming such as permaculture and apiculture, and to introduce more nutritious crops and better animal husbandry systems. People could plow following contour lines along steep slopes. Cow dung is not used here so it should be encouraged. The association wants to have a training center where farmers can go to see how simple systems with better planning can work for their crops. If you make a management plan, you need to have a center where you can focus [on important issues] and where people can ask questions. There is a plan to construct a SORALO office here so that experts will be able to come and make recommendations for land-use planning. The purpose of the association, however, is livelihood improvement rather than conserving the forest (I22a).

The first Chairman of the association has quite a different perception of the role of the association. He understands that is was created to deal with forest issues. For instance, the association asked elders not to bring livestock into the land surrounding Robert O'Meara's settlement and not to allow deforestation. This is considered an important goal because the forest is a water source and also a local source of firewood and building materials. The Chairman also sees the association as a source of funding, as an organisation that will attract investors to build tourist camps and provide employment opportunity for educated children who could be hired as experts. It could also help to build a school and harvest timber to fence *shambas* (I23).

When we attended the association meeting, we had a sense that much more is at stake than the conservation of the forest, the development of ecotourism, and the adoption of sustainable agricultural practices. The hot issue in this area is the conflict between the Purko and Loita Maasai. During the Olkonyil association meeting that we attended, this conflict was the main topic of discussion, along with the expectation of the Purko people that they will receive support from SORALO to defend their land rights. After the meeting, and elder we had previously interviewed asked us if he had "said anything wrong during our discussion with him" (I22b), probably fearing that wrong answers could decrease SORALO's support. The main expectation the Purko have of the partnership with SORALO and the association is that it could facilitate the granting of management rights over their land and resources and enable them to become independent of the Loita-dominated administration of the Loita Division and Morijo Location. The land in Morijo is Trust Land (Box 2) managed by the Kenyan nation on behalf of the people living there, who are mostly Loita. However, the Purko people can legally obtain control over the land where they live by creating an association (I22). This is the main reason why an association was set up rather than a Community-Based Organization (CBO). Since the Community Land Act was adopted, in 2016, the Purko people in Loita Division may also obtain land rights by demonstrating that they are a community (Iteam). The association has already hired a lawyer to conduct a study to evaluate this possibility (I22).

Box 2: Trust Land in Loita (from Kronenburg-Garcia, 2008)[21].

The Loita have managed to maintain control over their land, resisting state land reforms and other external interventions. They are the only Maasai Section in Kenya whose land has not been registered or titled as individual parcels or as a collective ranch. Their land is legally considered to be Trust Land managed by the Narok County Council for the benefit of its residents. According to the constitution of Kenya, Trust Land is governed according to the customary rules of the tribe, group, family or individuals that inhabit it. This means that the Loita people still rely on their own leaders and institutions to manage access to land and resources. Consequently, they did not experience the massive land sales, increasing socio-economic inequalities, and influx of non-Maasai immigrants that occurred in other sections.

The linkage between conservation agendas and local claims over land rights is not something new. It marks decades of history of relationship between the Purko and Loita people. Two major conflicts over resource control and access that involved external stakeholders have already occurred in the area. These conflicts are well known and have been analyzed extensively by Kronenburg-Garcia (Box 3). One such conflict involved the International Union for Conservation of Nature (IUCN). Our informants remember this conflict. According to them, the IUCN conservation project encompassed both the Loita and Purko sides of the forest, and there were people in favor and against the project on both Purko and Loita sides (I22a).

Box 3: Loita struggle to maintain control of access to land and forest (from Kronenburg-Garcia, 2008).

There is a long history of conflict between the Loita and Purko people. The Loita lived in the Loita Hills and Loita Plains, in what are today the Naroosura and the Maji Moto Group Ranches. The Purko settled in the area later, following their forced relocation by colonial authorities at the beginning of the 20th century. Today, the Loita people mainly live south of the Loita hills, including around the "Naimina Enkiyio" Forest, literally meaning the "place where people don't live" (also translated as "the forest of the lost child"). This forest may be the only area where they could expand their territory. The size of this forest is decreasing as Loita families open land to establish new settlements, create new pastures, and establish new fields. The forest has a great ecological value and has been object of several interventions aimed at reducing the autonomy of the Loita people to use its resources. In the early 1990s, the Narok County Council attempted to turn the area into a forest reserve and to develop tourism. Loita leaders organized resistance and filed a court case which was successful in stopping the Council's plan. In the 2000s, the International Union for Conservation of Nature (IUCN) attempted to develop a joint forest conservation project, but resistance flared up again, culminating with one death during a demonstration. The IUCN eventually withdrew the project.

In this tense political context, SORALO's attempt to conserve the forest may be perceived as a third wave of external intervention and may be strongly opposed, not by the direct beneficiaries, the Purko, as they would welcome an initiative that could help them to secure their rights over land and resources, but by the Loita people who claim rights on the same land.

[21] Kronenburg García, A., 2015. Contesting control: land and forest in the struggle for Loita Maasai self-government in Kenya. African Studies Centre, Leiden.

SORALO staff argue that if it adopted a Community-Based Natural Resource Management Approach, it should not face opposition from the communities. They also argue that although they have game scouts established in the area, they will not start to work before obtaining agreement from the authorities of the Loita Location. SORALO justifies its intervention by asserting that Naroosura, Elangata Enterit, and Loita should collaborate in the effort to establish a "Greater Loita Conservation Area" where both Loita and Purko people will be important stakeholders.

8. Development and planning

SORALO supports land-use planning to accompany land subdivision in Naroosura and other Group Ranches. This report is aimed at providing baseline information about the area and suggestions aimed at supporting these plans. In this section, we describe the land-use planning approach adopted by SORALO and the Group Ranch, and discuss the key challenges raised by this land use plan: retaining common land after subdivision, the creation of a community conservancy, and the improvement of the livestock system.

8.1. Land-use planning with support from SORALO

SORALO supports the Naroosura Group Ranch in a program that has three main components: the improvement of livestock systems, land-use planning, and conservation. Dr. Tome, an expert from Maasai Mara University, has been involved in the land use planning aspect of the program. Similar support is also proposed for the neighboring Group Ranch Elangata Enterit, and for the Loita Division, especially to the Purko settlements in the Morijo Location in Loita (see Section 7). Dr Tome recently administrated socio-economic surveys in Elangata Enterit and in Naroosura. The survey was given in 200 households in each Group Ranch, between February 28 and March 4, 2017. The data is currently being processed (Iteam).

The support for land-use planning has two main objectives: (1) to assess the resource base of the area and elaborate strategies to use it optimally and sustainably, and (2) to support the subdivision process and avoid the errors and negative impacts that occurred in the neighboring Maji Moto Group Ranch, which recently completed subdivision. It is assumed that the Group Ranch members do not anticipate all the possible negative consequences partly due to a lack of information. SORALO will provide such information through its land-use planning support. It intends to "empower people so that they will make the right decisions" (I2). According to land-use expert Dr Tome, SORALO will act as a facilitator and the Group Ranches will make their own decisions (I2).

Land-use planning is supposed to be implemented by the County government, which must produce a "spatial land-use plan" for the County, as is required by the Kenyan government following the adoption of the devolution policy. Narok County is currently developing a land-use plan but the process is slow because of insufficient technical capacity and financial resources. The County has therefore requested that local stakeholders develop their own plans, which will be used as the basis for land use negotiations (Iteam). This policy creates a strong incentive for Group Ranches to accept SORALO's support to develop land-use plans (I2).

As of now, the process has been initiated primarily in the Naroosura Group Ranch. SORALO offered its support during a meeting with Group Ranch leaders, and is currently starting a broader consultation with Group Ranch members to obtain the "good will of the people" (I2). SORALO is committed to

involving all social groups in the process and is aware that clan divisions must be considered as they have a strong influence over decision-making (I2). The Group Ranch leadership agreed with engaging in the land-use planning effort with SORALO. However, the communities have not yet given their consent to the process. SORALO must move slowly and cautiously because most community members want the subdivision to take place and fear that the land-use plan will be an impediment (I2). After the consultation process and once the communities have agreed to the partnership, SORALO will start to study the area, collect data about the climate, the population, and the land and land uses. SORALO's support involves an agriculture expert who will study the quality and potential of the soil, a veterinarian who will assess livestock health, a water expert, and a livestock expert who will provide advice about the best breeds to raise in the area.

SORALO and the land-use planning expert have already made several assumptions about how to improve land use. Naroosura encompasses about 180,000 acres of land for about 6,000 members. If all the land is subdivided equally, each household would receive about 30 acres. The carrying capacity is estimated at 1 Tropical Livestock Unit (TLU) per 16 acres, that is, about 2 TLU per household (I2). The notion of carrying capacity is contested and there is great uncertainty concerning the meaning of this figure of 1 TLU/16 acres, which was produced by FAO some time ago. But obviously, there is an upper limit on how many livestock the land can support. This upper limit fluctuates, depends on changing management systems, and is difficult to calculate with any accuracy, but it is there nevertheless. It is also quite clear that this upper limit is far below the number of livestock that Naroosura would need if all households were to sustain themselves as pure pastoralists. At least, this is what the people in Naroosura strongly believe.

Hence pure, traditional pastoralism is no longer a viable livelihood strategy if it is adopted by all or by the majority of the current population. Livestock systems need to change and/or the livelihood strategies need to diversify. SORALO plans to assess the quality of the grass and the availability of water, and to use this information to propose changes to the livestock management system. Aware of the importance of mobility to sustain pastoralism in arid and semi-arid areas, it plans to identify critical resources that will be kept under collective management, such as dry season pastures and water resources (I2). According to Dr. Tome, the Group Ranch could be broken into smaller units that would each have their own management institution, for example at the village scale. Families living in the same village are often from the same lineage, and this may facilitate resource management decision. SORALO also considers that the introduction of more productive livestock breeds, improvement of forage quality, and reduction of the number of animals, will be essential to succeed (I2). Dr. Tome feels that subdivision and breed improvement must be accomplished hand-in-hand. He points out that some recently introduced breeds are worth three times the value of traditional breeds.

Land-use planning is likely to face great difficulties in the highlands. Population growth has motivated some people to settle permanently on the forest edge to cultivate maize and beans and to raise livestock, which are exposed to pneumonia if they remain in the area during the rainy season. In the past, this land was used for grazing during the dry season and there were no permanent settlements in the area. SORALO wishes to evict the settlers through the land-use plan process, and to protect the forest by creating a buffer zone where there would be no farming. Illegal logging would be controlled and livestock grazing would be suppressed or minimized (Iteam).

The opinion of a Group Ranch leader about the support provided by SORALO is reflected in the following story:

> We met with SORALO and discussed with them that we should make a good plan before land subdivision begins. We have an expert on the ground already and we agreed that we will divide the land according to the plan. There should be an area for wildlife and for livestock. Areas for schools or other special interests like the conservancy will need to be discussed. If we divide the land without considering these land-uses, it will go wrong. So we agreed that SORALO will help with the planning. We need to demarcate the land using information about which place is suitable for each activity. We work also with SORALO to obtain better breeds of livestock and to get good quality bulls for all our members, because our land is going to be smaller so the rains and drought will affect us more. The pasture is not as good as it was in the past. Therefore we agreed to work with SORALO. We own a piece of land not far from Naroosura that we want to give them to do some projects with livestock. This is what we are doing now. We need to finish giving title deeds for the agricultural area and after this, it will be the time to divide the larger part of our territory. It is not easy. It will require a lot of consultation with the government and with the owners of the land. But so far we are happy with what we are doing. Once we get these good breeds for our members, I am sure our life will change because Maasai people depend on livestock. We will have a small number of animals but they will be high quality breeds (I32).

Through our interviews with a limited number of informants, we perceived a few differences between the visions of SORALO and the Group Ranch. For SORALO, wildlife conservation appears to be a more central concern. Development is also important because SORALO is committed to support conservation efforts that improve local wellbeing and, as an organization created and led by Maasai people, is involved in advocating for Maasai rights to a decent livelihood. However, conservation occupies more space in SORALO's activities and discourses than it does in the discourse of the Group Ranch leadership and members. For the Group Ranch leaders, the main objective is development, that is, strengthening the economy and the wellbeing of the people in the Group Ranch. Wildlife conservation is acceptable insofar as it contributes to these livelihood improvements. Both SORALO and the Group Ranch share the same objectives, but the priorities are slightly different. If trade-offs between land uses were revealed during the mapping process, SORALO and the Group Ranch may likely have different visions about how to solve them. For example, such trade-offs may appear if the Group Ranch decides to support irrigation and agricultural expansion on a large scale in the plains. Indeed, an irrigation mega-project is already being discussed:

> Last week I attended a workshop organised by the national irrigation board. They agreed to construct a mega dam so that people in the plains will be able to develop irrigation. These dams will be built in seasonal rivers. My perception of block 2 [which includes the plains and the highlands] is that there is still much to be done to improve the livelihood of the settlers in this area. There are three possibilities for development in this area: (1) a conservancy with land that belongs to the members of block 2; (2) the mega dams that would benefit all the members of block 2 [that is, 6,000 members – 1,740 Block 1 members =4,260 Block 2 members]; and (3) a good breed of livestock. I was asked to indicate spots where we could put the mega dams, in the areas where people who do not have access to irrigation are living. We need to see if these 3 things can be done to improve the livelihoods of our members. This is why, when the National Irrigation Board proposed the mega-dam to the Naroosura Group Ranch, we approved it. We have already agreed, so now it is up to the government to implement the project to be sure that all families will have something to eat on the table (I32).

For the Group Ranch leader, to build large dams to develop irrigated farming is of paramount importance. Small dams are important too, but mostly for livestock because they do not supply enough water for farming. Water may be the most important natural resource for which support for improved management is expected. SORALO agrees with the idea of improving access to water. For instance, it plans to support the Group Ranch in planting trees in some water catchments areas and in fencing water sources (I32). But given that its mandate is also conservation, it understandably may not support the mega-dam idea if it had a negative impact on wildlife.

The greater emphasis placed on farming by the Group Ranch leaders compared with SORALO's emphasis on conservation is also visible in their visions for the future of the highlands. The Group Ranch proposes to allow members in the lowlands to gain access to land in the highlands, approximately 10 acres, for cultivation because crops can grow there even when there is less rain (I32). The Group Ranch is also interested in promoting conservation, though. It shares SORALO's vision that every member of the Group Ranch will contribute some of his land to create a large area where a conservancy can be established (I32).

8.2. Retaining common land in the Group Ranch after subdivision

SORALO and the Group Ranch agree on the principle that not all land should be subdivided. This poses the following key questions: To what extent can this principle be applied? Will this be accepted by Group Ranch members?

The Group Ranch leadership asked SORALO to help them undertake land-use planning to identify where they should retain some common land and to avoid the mistakes made in Maji Moto Group Ranch. The Group Ranch would like to keep some common land for schools and have some land reserved for future generations. It would like to keep some space available to build research centers, universities, health centers, or anything that future may demand. The Group Ranch leaders are also willing to set aside areas that are not suitable for farming or settlement as common land for grazing. For example, 10 households may decide to each give 10 acres to create a common area for wet season grazing, totalling 200 acres. However, this vision of the leaders is not shared by other members of the Group Ranch, at least the younger generation, which wants its own private plots (I32). As the Group Ranch leader stated:

> Common lands in the early 1970s were very useful. People at this time said: "let's go to that particular area," and a customary arrangement was made. But the young generation does not want this. This is where the challenges lie. Personally, I own 200 cows and 500 shoats. Someone else has [only] 10 cows and 30 shoats. Our livestock grazes together and perishes together if there is a drought. But the young who have only a few livestock say that they don't want common land because they don't want to solve a problem that is not theirs [large herds finishing off the resources]. We intend to tell them that through planning, all members who want a common place where their livestock can graze together can have it. They will pool their resources. They will be able to decide to share all their land in common. Five or ten people could do this. It depends on the families. Thus, we could create a large ranch that will be common for these land owners (I32).

8.3. The creation of a conservancy

For SORALO, the main purpose of the conservancy is to preserve the migratory corridors used by wildlife. SORALO is committed to raising the awareness of the Group Ranch Committees in Naroosura

and Elangata about these corridors. One such corridor extends between Amboseli and Magadi, Elangata Enterit, Naroosura, Ntuka and then through Maji Moto and Mara. Another extends from Amboseli to the Loita forest and then to Naroosura, Naikara, Oldekesi, and Mara. A third one goes from Ewaso-Ngiro to Oldenyo Orasa, Maji Moto, Siana, and Mara. All three are elephant corridors. They are ancient corridors that have been blocked by human settlements, which causes conflicts with elephants trampling the settlements. Elephants follow their instincts, and 20 years later they will continue to pass through the same places. SORALO wants to see where these corridors can be opened to allow the elephants to migrate. But it is not an easy task because the land is now titled. SORALO is considering proposing land easements where people will be paid money to open their land. This can easily be done with pastoralists, but is more difficult with farmers because the elephants will eat their crops. So SORALO is examining the option of keeping land in the hands of pastoralists and paying them easements or providing other non-monetary advantages, so that there will be space for wildlife conservation. Pastoralists will also benefit because the conservancies will serve as grass banks during the dry season (Iteam).

Besides the migratory corridors, other critical resources for conservation include salt licks, water sources, the Loita hills, and the banks along the Ewaso Ngiro River. During the dry season, the main resource that both livestock and wildlife require is water. They converge at water sources (Iteam).

For the Group Ranch, one great interest in having a conservancy is that it can be used as a grass bank during the dry season. The conservancy or conservancies will be created by asking Group Ranch members to pool part of the land being allocated to them, as they would do to create common pastures. SORALO's land-use planning support will help to identify the areas where these conservancies should be established, taking in consideration scientific data but also the traditional knowledge that local communities have about ecosystems, wildlife movements, and livestock needs (I32).

8.4. Improving the livestock system

SORALO is supporting the improvement of the livestock management system by introducing new breeds and new ways to manage pastures. It considers that the zebu cow is no longer sufficiently productive and that a livestock breeding program, in conjunction with the creation of a slaughterhouse, can increase the market value of cattle. The goal is to provide equivalent or greater production from fewer and healthier animals than the status quo. A zebu cow gives 1-3 liters of milk while a Sihawal cow gives 5-7 litres. To accommodate fewer cows that give more milk and grow faster is expected to reduce the pressure on resources and limit pasture degradation (Iteam). The Boran and Sihawal cattle breeds produce calves that grow fast and generate good money. One 22-month-old bull can be sold for 50,000 KSh, while a zebu calf of the same age is worth less than 10,000 KSh (Iteam).

SORALO took a group of Group Ranch members to a farm in the Maasai Mara area to allow them to observe first-hand the changes that people had made there. They also visited the Enonkishu Conservancy. The group bought a Sahiwal bull to cross breed it with their own cattle. The heifers and bulls that were born from cross breeding local cows with this Sahiwal bull are a considered "better" breed because they grow more rapidly and produce more milk. After 1 year, a calf has already reached half the weight of its parents. They get very large and people can make more money from milk production. SORALO also organized a seminar in Narok with livestock breeders. All of the leaders of the

Group Ranch attended and agreed that the project proposed by SORALO should take place in their area (I13).

To facilitate the introduction of new cattle breeds and to demonstrate new ways to manage livestock, SORALO intends to create a demonstration ranch. It will use a piece of land (5,000 acres) that belongs to the "Purko Trust" [22], which has agreed to provide the area for the project. This land was carved out of the Naroosura Group Ranch in 1970 to establish the Purko community. There had already been a breeding project on this land at which time the Sahiwal heifer was introduced. However, it was not successful. The new project promoted by SORALO will likewise focus on introducing new cattle breeds, by bringing new heifers and bulls and by training Group Ranch members in breeding techniques. It will also create demonstrations of improved pasture management, since pasture improvement is required to feed cattle that are heavy milk producers. SORALO will help with pasture rehabilitation and introduce forage cultivation. The Purko Trust Land will be used as a demonstration field that includes a grass bank, improved pasture management, improved breed management, pasture cultivation, and conservation. People will be able to visit to observe these models and apply them on their own lands (I13).

Regarding grazing improvements, interesting inputs are being proposed by Robert O'Meara, who is partner of SORALO in the Purko settlements of the Morijo Division in Loita (see Section 7.3). Mr O'Meara proposes an approach that consists of concentrating livestock to graze in the same place for a limited period of time and then move to another area. This is called semi-holistic management. It works well when wildlife and livestock use the same grazing resources. It is the rotation system that the Maasai people used to manage their livestock in the past, but is no longer practiced and has been lost (see Section 5.2).. By reintroducing this traditional management system, called *kondimoja* (meaning "the one herd system"), a conservancy where O'Meara was working had a survival rate of 80% of lion cubs, whereas before their survival rate was only 15-25%. When the herds spread across the landscape, there is not enough space for wildlife. Livestock managed properly in the traditional way thus supports higher wildlife populations (I21). According to a team mate from SORALO, this approach will eventually return in certain localities as an adaptation to climate change, while other SORALO colleagues wonder whether it is still be applicable in the current context, with higher human population densities and dispersed settlements.

Robert O'Meara also suggested that some land be closed off to gazing for certain periods of time to protect critical resources. He provides the example of *Themidia triandra*, which is considered a useful grass and the second best for livestock pasture, but which does not survive overgrazing. "The sheep do not give it a chance." This grass is found in the highlands, but the pastures are degraded with large bare spots. There is also a lot of this grass in the Maasai Mara plains. Management improvements in the Olare Orok and Olare Motorogi conservancies have resulted in significant improvement of pastures, although according to one SORALO representative, these have also generated conflicts.

In one experiment, the managers did not allow livestock to graze on a *Themidia* pasture for a period of 2 years to allow the grass to reseed. During the third year, 5,000 cattle were allowed to graze on the pasture for a period of 2 months. *Themidia triandra* requires 2 weeks of rain to produce seed if it is 20

[22] The headquarters of the Purko trust is located in the Oletipis Market, in the Mau escarpment, approximately 10 km outside of Mau Narok. Here, they have a sheep improvement project that has operated for the past 60 years. They introduced the Merino sheep to the area (I13). (CHECK THAT I HAVE KEPT THE MEANING – DO YOU MEAN ONE PROJECT OR SEVERAL PROJECTS – GRAMMAR IS INCONSISTENT AND YOU DESCRIBE ONLY THE SHEEP PROJECT, SO I HAVE INTERPRETED THIS AS ONE PROJECT, BUT I MIGHT BE WRONG)

cm tall, or 8 weeks of rain if it is 5 cm tall following sheep grazing. During the fourth year, there was sufficient rain and the cattle could not keep up with eating the grass. In that year, 30,000 balls of hay were sold to a company to feed hippos, wildlife and cattle during the dry season. In sum, according to O'Meara, if there was a rotation of sheep and cattle on different pasture plots [managed through paddocking], the carrying capacity for livestock would be far greater than it is today. Unfortunately, there is no scientific publication that measures and compares the relative carrying capacity under these different grazing systems (I21).

8.5. Conclusion

The land-use planning vision of SORALO is associated with a vision of development that emphasizes improved grazing management and the introduction of new cattle breeds to establish a more intensive livestock system. Attention is also paid to ancient grazing management systems, which are collapsing but could be reinvigorated. SORALO will establish a demonstration plot that herders can visit to learn how to improve their livestock management systems.

The second emphasis of SORALO is wildlife conservation. For SORALO and its partners, conservation must be accomplished hand-in-hand with the improvement of livestock systems because it will lead to the creation of grass banks that livestock can use during the dry season. Conservation areas will be closed to livestock grazing during the rainy season, but open during the dry seasons, or at least during severe droughts.

One possible limitation of SORALO's approach is that it may be excessively optimistic about the potential of new breeds and the possibility to return to former grazing management systems. Maasai people in Naroosura are shifting from larger to smaller, less demanding animals. They raise more shoats and fewer cattle than in the past, as a way to adapt to climate change and pasture degradation. The adoption of new breeds that demand better pastures would reverse that tendency, which may make it unsuitable for a majority of herders. Regarding the collapse of traditional grazing management schemes, it may be the result of population growth and of the increasing influence of educated young people. If these trends are not reversed, one can wonder if the traditional grazing management system can come back. This system faces constraints that it did not face in the past. Innovation, rather than a return to past rules and practices, may be needed to escape land degradation.

Another limitation is that SORALO may be placing insufficient emphasis on farming. SORALO acknowledges the importance of farming in the area, but legitimately perceives that cultivation will compete with livestock herding and wildlife conservation; that it will lead to the conversion of some pastoral land into farm land that is closed to livestock; and that it may increase conflicts with wildlife and restrict wildlife movement. SORALO, having worked mainly on rangelands where farming is not very developed or is concentrated in a few specific places, may not be sufficiently aware of the shift from pastoralism to agro-pastoralism that has been taking place in Naroosura over the past 50 years. The Group Ranch leadership, on the other hand, is very aware of the importance of farming for the livelihood of its people, even in the plains which were traditionally dedicated to pastoralism. This is illustrated by their interest in mega-dam projects.

The trade-offs between the development of pastoralism and conservation have been solved. It is currently well known that both can thrive together if conservation areas are used as grass bank for livestock grazing during the dry season. SORALO and partners such as the African Conservation Center

are leaders in the development and promotion of management solutions that reconcile pastoralism and conservation objectives. But Naroosura faces the triple challenge of reconciling the development of livestock husbandry, farming, and conservation objectives. This is the challenge that SORALO's land-use plan will need to answer.

9. Recommendations for land-use planning and subdivision

In this section, we propose a few possible directions for the triple reconciliation of farming, pastoralism, and wildlife conservation in the Naroosura Group Ranch through land-use planning.

9.1. Key results

First, we will provide a brief overview of key results of the study on which these recommendations are based:

1. Naroosura is engaged in a transition from pastoralism to agro-pastoralism. The transition began in the 1960's in the areas suitable for irrigated farming, quickly spread into the highlands where rain-fed farming could be practiced, and most recently has spread to the plains, where small-scale subsistence farming is common and where small-scale irrigated farming using water harvesting dams has recently been developed. Today, farming is in great part business-oriented and can generate significant income for households. However, it requires significant investment of capital and the ability to take risks, except for small scale beans and maize cultivation.
2. Naroosura is also engaged in a transition from communal to individual property rights, as exemplified by a shift from collective to individual *olokeri*. This transition is concomitant with the development of farming, the increase of population density, and the spread of settlements across the landscape. Individual appropriation of land has recently accelerated in anticipation of the subdivision process.
3. The changes described above are contributing to the collapse of the traditional land management system. Councils of Elders are losing their authority while the power of Village Committees is increasing. New institutional arrangements are being created and the final outcomes are not yet established. The modalities and effectiveness of governance vary greatly from place to place. In many localities, the traditional grazing system has collapsed and alternative management systems have not yet evolved, which has contributed to the degradation of the rangeland.
4. There is an important gap between preferred the livelihood strategies and visions of the future of elders on one side, and those preferred by younger people on the other side. Elders own many livestock and remain attached to traditional, communal ways of managing access to land and resources, while young people are more interested in farming and want to own their own private piece of land. The articulation between these two visions and livelihood strategies depends on the extent to which the two governing bodies (the Council of Elders and the Village Committees) will work in opposition to or in collaboration with each other.

The reconciliation of farming, pastoralism and conservation objectives will thus face social and institutional challenges in addition to ecological and technical constraints.

9.2. Key objectives and principles to adopt in the subdivision process

This section provides some basic data on the physical and material conditions of the Group Ranch, which are critical to consider prior to developing recommendations for land-use planning.

On average, Group Ranch members each have access to about 30 acres of land (153,000 acres / 6,000 members) within the ranch. Under these conditions, pure traditional pastoralism is no longer viable as a livelihood strategy at the scale of the entire Naroosura population. With only 30 acres per person, it is not possible to support the number of livestock required to sustain an average household (i.e. a couple with 3-5 children), even during the rainy season. If we assume that the carrying capacity is 1 TLU/15 acres (I2), one household, on average, can feed only 2 TLU with 30 acres. Between 20-40 cows and 100-150 shoats are required to support a single household, and therefore pure pastoralism cannot be sustained at the current human population density. The figures of how many TLU a household requires to survive and how many TLU the land can support are obviously uncertain, given the difficulties in establishing such figures. However, the enormous gap between the estimations of how much livestock is needed to sustain livelihoods and how much can be raised makes the conclusion plausible even on the assumption that the errors in these estimations are significant. The experience and common sense of our informants all plead in favor of the conclusion that traditional, extensive pastoralism alone cannot sustain livelihoods in Naroosura. Farming, on the other hand, can sustain a household with just 1-2 acres if the land is irrigated, and 3-5 acres if it is not irrigated. Therefore, farming must play a prominent role in the future of Naroosura.

This being stated, we will make three key propositions regarding future land uses in Naroosura.

9.2.1. Allocating land to cultivation

The identification of land suitable for cultivation and its even distribution among the members of the Group Ranch should be a priority. Currently, non-local business farmers are investing in the development of larger farming operations in the area. They out-compete the locals and will progressively reduce the available opportunities for farming if local people are not supported and given an advantage over them. These non-local farmers will also buy land once land titles are distributed by the subdivision process. Proper land-use planning and land allocation combined with support to develop irrigation infrastructure and to regulate land transactions can reduce the advantages held by these outsiders and help local people develop their land and cultivate on their own.

If we take the figure of 3 acres of agricultural land as an average (based on a per-household allocation of 3 to 5 acres of non-irrigated land or 1-2 acres of irrigated land), about 18,000 acres of land, most of them irrigated, are necessary for Group Ranch members in Naroosura to sustain a decent livelihood. This assumes that some pastoralism will still be practiced and combined with farming. These 18,000 acres would be allocated to individual households. 11,000 acres are already in the process of being allocated to 1,740 households in Block 1. Therefore, to maintain social equity in land holding, the 4,260 remaining households should receive an estimated 12,780 acres of land (4,260 households x 3 acres/household), which needs to be identified in Block 2. This would allow them to practice farming, leading to a total of 23,780 acres of agricultural land within the 153,000 acres of Naroosura Group Ranch. The question of whether such potential exists in the area is a pressing research question. Obviously, the answer will depend on determining how much land is suitable for irrigation without generating excessive constraints on other land uses such as pastoralism and conservation. It will depend

also on the commitment of the government and its technical and financial partners to invest in irrigation schemes. Whether the mega dam described in section 8.1 will be constructed may be a key determinant on whether this objective can be achieved.

Our findings do not imply that pure traditional pastoralism will disappear. It is likely that some households will continue to practice it, while others will focus exclusively on farming, or develop still other livelihood strategies such as petty businesses or seeking employment elsewhere. Although oversimplifications are dangerous, the formulation of an average figure is nevertheless necessary to justify policy decisions and move management structures in the right direction. Based on our study, we believe that the general direction that the Group Ranch should adopt is to pursue the transition to agro-pastoralism by identifying land that is suitable for farming, because pure traditional pastoralism is no longer able to support the entire population of the Group Ranch given increasing population density, monetary needs, and frequency of drought. Each village will need to be provided with a level of autonomy so that each household is supported to choose their preferred pathway to achieve this transition, as will be discussed later in this report. The development of farming is not the only strategy for livelihood diversification, though. Other pathways need to be considered. Education may play a significant role in improving livelihoods if young educated people can access jobs. Conservation could also generate income by attracting tourists and through payment for ecosystem services, conservation easement, or other subsidy schemes (see Section 9.2.3.).

Pastoralism could benefit rather than suffer from the development of farming if the transition is properly managed, since farming can increase resources available for livestock. Degraded land can be transformed through farming and produce abundant forage during fallow periods between cultivation cycles. A cultivated plot can produce more forage that was produced on the same plot before its cultivation, as was mentioned by an informant in Nkimba (I27). Crop residues can be consumed by livestock and forage crops can be cultivated. In sum, farming does not necessarily reduce grazing resources, depending on the system adopted and its integration with livestock husbandry.

12,780 acres of additional agricultural land will need to be identified while taking into consideration other objectives such as wildlife conservation and pastoralism. These 12,780 acres could provide land for households to create settlements. Allocated plots could be expanded beyond 3 acres per household to also include the settlement and land for an *olokeri*, for the grazing of weak animals during the dry season. The privatization of *olokeri* is already underway and it is logical to incorporate this process into land-use planning. The total area of allocated plots would therefore be more than 3 acres per household. The exact figure needs to be discussed further and may need to be adjusted in different villages to take local conditions into account.

9.2.2. Management of grazing land

Once agricultural land has been identified and allocated, the question remains of whether pastoral land should also be subdivided or not. Elders with many livestock reject the idea of subdividing pastoral land because it will limit herd mobility, and will lead to land sales and the arrival of people from different tribes who may not follow community rules. Since they generally have large herds, elders would further be unable to feed their herds on the piece of land they would receive. Young people, on the contrary, generally want all the land to be subdivided to enable them to sell land to support their diversification into other economic activities. They would like to secure access to pastoral resources by fencing their

land if they have only a few livestock. Fences would avoid resource depletion by the large herds of other people during the dry season. The contrast between the interests of these two groups is likely to result in tensions and conflicts during land-use planning that should not be underestimated.

The solutions to this conundrum involve flexibility and autonomy. Concretely, this means that different villages or groups of people should be given the autonomy to make their own choices. Some villages may want to pool their resources and maintain communal grazing land, while others may decide to divide part of their land into private pastures reserved for rainy season grazing, while keeping another part of their land as communal for dry season grazing. Others may decide to keep the whole grazing area communal. Some neighbouring villages may decide to form a group to share their grazing land. Each village should engage a negotiation process that involves its inhabitants and neighbouring villages. With such a polycentric model, there would be multiple autonomous centers of decisions. We assume that each of these local entities can make better choices about what is best for their communities than external actors. This does not mean that the Group Ranch leaders will not have a role to play. They could be called in to settle conflicts that may arise within and between groups, and could coordinate land use decisions at the scale of the entire Group Ranch. To achieve conservation objectives requires combining the various interests and needs of land users at different scales, which justifies the important roles of both Villages and Group Ranches leaders in decision-making. The Group Ranch may also be involved in the development of major infrastructure projects that involve several villages, such as the construction of the large dams proposed by the Group Ranch Chairman (see Section 8).

Flexibility also implies the possibility to adjust the situation according to future changes, desires and needs. If some land remains communal, it can be allocated to new Group Ranch members in the future, making it easier to adjust to population growth. This may help solve the inter-generational conflicts that arise in many Group Ranches when the age sets that were too young to receive land when subdivision was implemented enter into disputes with Group Ranch leaders, when they grow up and need land to settle. The optimal balance between agricultural and pastoral land today may not be the optimal balance in the future. When people in agro-pastoral landscapes have sufficient autonomy to adapt their land uses and land allocation to respond to population growth, they typically convert pastoral lands into agricultural land, starting with the best available land and finishing with the most marginal. This occurred in the Loliondo district, North-West Tanzania (see Research Scoping Report #4), where villages institutions designed their own rules to allocate land to individual households in the context of a growing population and a shift from pastoralism to agro-pastoralism. Subdivision in this case is an ongoing process that will last for several generations rather than an operation done once, such as is planned in Kenyan Group Ranches.

9.2.3. Conservation

Group Ranches have a key role to play in wildlife conservation. They should be tasked with collecting information about the location of wildlife corridors in collaboration with SORALO and its partner organisations. If conservation is to be achieved ethically, it will need to be negotiated with Group Ranch members and it cannot be imposed. Obviously, there is a trade-off between conservation and development in Naroosura, and this trade-off, exemplified by the human-wildlife conflicts, is likely to increase in the future with the expansion of farming. Compensation, monetary or non-monetary, in addition to initiatives that reduce human-wildlife interactions, such as elephant fences or scout patrols, are required to solve this trade-off. Currently, even though it is required by law, compensation for

wildlife damage to crops and injury to people is not being provided. In the long term, even compensation may not be sufficient for wildlife protection. If the people living in Naroosura need to cultivate the land to sustain their livelihoods, and if farming increasingly conflicts with wildlife, the trade-offs will increase and the levels of compensation and the mitigation or preventive measures required to make conservation ethical will likewise increase. Tourism will alleviate the problem only if it becomes significantly more developed and its revenues are more equally distributed. Unfortunately, this is unlikely since tourism generally benefits only a small group of people. The broad issue of compensation, including approaches such as direct payments, conservation easements, payment of conservation royalties, payment for ecosystem services, and subsidies, needs to be debated. Up until now, policy makers have been reluctant to consider these options. Furthermore, compensation rarely matches the opportunity costs of conservation, which are likely to be high in Naroosura (although this needs to be further assessed) given the high population density and local interest in developing farming. If this situation persists, wildlife conservation may face a difficult reality of being either untenable or socially unethical.

The creation of a conservation area also raises the question of how much land will be required. This will need to be decided through a process of negotiation in which political and financial (i.e. compensation) considerations will play as much of a role as science. Of the 30 acres that each household may receive during subdivision, some may be private land, some may be communal grazing land defined at village level, and some may be dedicated to the creation of a conservation area that will also serve as a grass bank during the dry season, possibly with a core zone that will only be open during severe droughts. If each household contributes 5 acres, then the conservation area will encompass 30,000 acres. But the area committed to conservation will depend on the monetary and non-monetary benefits that are expected and obtained by local people. The greater the benefits, the more land will be effectively allocated to conservation.

If all members of the Group Ranch give an equal share of their land to the conservation area, then it is important that any monetary benefits that arise be equitably distributed. Typically, conservation benefits are managed by Committees or other community institutions, which decide how they should be used. Such community organisations are created with the support of NGOs and most of the “local” decisions taken are based on the suggestions of these NGOs. These Committees typically propose projects that range from constructing a school to supporting small businesses, like chicken farms or bee keeping. These businesses generally fail, generating frustration among community members who do not receive any of the promised benefits of conservation activities. There are also innumerable cases of corruption in such Committees. For these reasons, we suggest that an approach consisting of equally distributing a significant portion of the economic benefits arising from conservation to all Group Ranch members should be debated within the communities and among its partners. Once these direct payments are done, the remaining of the conservation benefits could go to a community fund, to pay for school fees or for hiring school teachers, for instance.

Note that the pooling of land by all Group Ranch members to create a conservancy does not imply that only one conservancy will be created, nor does it imply that all members will provide an equal share of land. There should be at least two conservancies in the area, one to protect wildlife corridors in the plains, and one to protect the forests in the highlands. People in the plains could pool their resources to create a conservancy in the plains, while those in the highlands could pool their resources to create one in the forest. The acreage allocated to conservation does not need to be the same in these different

areas. Each group would receive benefits from their respective conservancy. We believe that all households should be given the option to create a conservancy. In Maji Moto, a conservancy was created after land subdivision took place, using only the land of certain Group Ranch members. Only those members who contributed their land are eligible to receive benefit from the conservancy. This has created tensions and frustration because not all households that previously used that land for dry season grazing have been allocated land in the conservancy. Those who were not allocated cannot graze anymore in that area and do not receive any benefit from the conservancy.

Creating conservancies does not imply that wildlife movements are restricted only to the conservancies. Communal grazing areas will also be used by wildlife, which is an additional and important argument for not dividing pastoral land. As with livestock management, wildlife management will need to be considered at the scale of the entire Group Ranch and its neighbouring ranches, with the conservancies acting as grazing refuges for both wildlife and livestock.

9.3. Improving the performances of livestock and cropping systems

Land-use planning needs to articulate with technical innovation. In this section, we will make a few suggestions for the improvement of livestock and cropping systems.

First, experience shows that endogenous technical innovation is almost always more successful than externally-driven innovation. Peasants and pastoralists know how to select the best options for them. They make better choices than outsiders who conduct studies with the purpose of helping them. The role of external experts is to identify new options that may not be known locally, and to accelerate local innovation by creating an environment that is conducive to this. But it is then up to the beneficiaries to decide which innovations are best for them among this broader choice of options.

This flexible, bottom-up approach to decision-making means that a broad range of livestock breeds and management systems should be proposed, ranging from a return to traditional systems to semi-holistic, holistic, or zero grazing management systems. However, none of these systems should be considered the best solution a priori. Peasants and pastoralists consider a multitude of criteria before making livelihood and resource management decisions, many of which we may not have identified in this report. The risks, impacts on the environment and future livelihood options, productivity of labour, estimated profits, yield per acre, and many other potential benefits and costs that can only be perceived from within specific cultural and social systems are all key criteria that peasants or pastoralists consider when they make decisions to improve their livelihoods and land management practices.

NGOs and the projects supporting local people generally overlook most of the factors local people take into consideration. The fact that Maasai herders adapt to climate change and land degradation by raising smaller, more resistant animals, while external support focusses on larger, more demanding animals, is a contradiction that needs to be addressed and may reflect that lack of consideration for local constraints and complexities. We don't imply here that larger animals should not be supported. But if they are, they should remain one option among others and the constraints to their adoption should be considered seriously.

The same principle applies to farming. Households should be proposed the broadest possible range of technical options, providing significant flexibility to maximize the chance that useful innovations will emerge and be adopted. We can nevertheless identify a few directions that warrant special attention.

Innovations that will increase the efficiency of irrigation should be prioritized to enable greater production using less water. Reducing the use of chemicals by adopting biological methods to fight against pests should also be explored. Using less chemicals may also reduce the level of investment required for farming and reduce the economic barriers that limit local peoples' entry into farming, improving their participation in that activity compared to the participation of outsiders that can proceed to large investments. The lower use of chemicals will also reduce livelihood risk, as lower investment costs means that farmers can make a profit even when the prices of their products are low. The establishment of cooperatives to organize producers so that they can sell their produce directly, without depending on middlemen who appropriate a large share of the value of the product, will also be beneficial. Eventually, transportation could be improved, by introducing light carts that could be built locally and pulled by oxen, facilitating the transport of products, but also of inputs like manure, whose use could reduce the costs of production and avoid decline in soil fertility.

These suggested technical innovations do not concern land-use planning *per se.* However, the two are connected. The types of innovations that are adopted in Naroosura will determine what types of land can be used for different purposes. Soil fertility is both a cause and consequence of the type of land use being practiced. Farmers build soils and landscapes through their activities. Soils that are not currently considered suitable for farming may be made suitable through proper management practices in the longer term, depending on the resources and technologies available. This is particularly true in places where abundant manure is produced. A simple change such as the introduction of light carts pulled by ox-plows in the plains could stimulate the use of manure, leading to a redefinition of criteria used to decide which land is most appropriate for farming. In such a context, the lands closest to corrals and dwellings may be cultivated even if initially unfertile because it will be easier to improve the soil through spreading manure on these plots. Similarly, the introduction of drought-resistant varieties of crops could significantly modify the distribution and extent of land suitable for farming. Again, this calls for flexible approaches that will trigger long-lasting innovation processes, meaning that the optimal land use zoning of the area should not be static and will continually need to be revised. The allocation of some land to households while retaining some communal land, and the retention of the option to allocate this communal land in the future if necessary and if new land-use options become available, provides flexibility and allows for on-going adaptation to a dynamic socio-economic, ecological and political context.

9.4. Land sale

In this last recommendation, we wish to outline some possible future problems that may arise following the process of land subdivision. Experience shows that under free market conditions, a lot of land is sold following the implementation of subdivision. This increases social inequalities, as poor households sell their land at low prices during emergencies and to satisfy basic needs like paying school fees or hospital bills. Young uneducated men sell their land for low prices to get capital to start business ventures that often fail, while investors, both local and external, who are more astute about land markets, purchase and accumulate land, resulting in a concentration of economic and political power that dispossesses the original inhabitants. In a system where the market is set free, many people may lose the freedom of choice and future livelihood possibilities because they would lose their assets. The term "free market" is ambiguous as it does not say if it is the market that is free, or the people in the market place. It conflates the two ideas, assuming implicitly that if the market is free, then the people in it are free, which is not

supported by any logic. If the purpose is to have free people making optimal individual choices within a market system, then the market needs in fact to be regulated, since when set free, it simply leads to the concentration of assets into the hands of the most powerful. Land is no exception and hence the land market needs to be controlled. Some rules must be established to prevent rapid land sales and the rising inequalities through accumulation and dispossession. The following regulations, some of which were suggested by our informants, are possible options:

- Giving land title under the joint-tenancy modality of the 2012 Land Act, where several persons (typically, a husband and his wife) co-own the land, having exactly the same rights on it.
- Setting a limit on the amount of land that one person or household in the Group Ranch is allowed to own.
- Banning the sale of land to outsiders, or minimally regulating these sales through taxation and by setting a maximum acreage.
- Allocating usufruct rights rather than full, alienable property rights, as was done for farm land in Ol'Kiramatian. This could be limited to a transition period during which people would learn the meaning of having individual land rights and understand the real value of their land.
- Maintaining some communal land (see Section 9.2.2), which would reduce the interest of outsiders in buying land.
- If land remains communal and is not sub-divided, dividing the Group Ranches into as many entities as there are villages, and creating a distinct community land for each village, which will improve the accountability of the leaders to their constituents since they will live in the same place and use the same resources.

Each of these restrictions will inevitably be opposed by the large number of people who perceive that selling land is the only escape from a purely pastoralist livelihood that is no longer viable in the long run. For a young man who owns a piece of land on which farming is not feasible, who lacks the connections and resources to access distant pastoral land during severe droughts, and who has received some education, the possibility of selling land in order to finance a new business or to migrate to the city to find a job may be the best option. This is likely the main reason why subdivision is so popular among the younger generation. One of the main challenges for achieving subdivision is the conciliation of the conflicting interests of young people and elders. Support for the development of farming through irrigation projects will play a key role in resolving this tension.

Appendix 1: Future research

Introduction

This report is based on 34 interviews conducted over a period of less than 2 weeks. It is preliminary baseline research, and further studies need to be undertaken to verify the key findings. We suggest two ways to achieve this:

- Questionnaire surveys. These can be achieved by recruiting and training local enumerators among Group Ranch members. These enumerators can be equipped with tablets and provided with ad-hoc surveys whenever a relevant topic or question emerges that requires more thorough investigation. In this section, we propose several draft questionnaires that address a few key topics identified in this report and that require further research. These questionnaires could be implemented in a random sample of households. At this stage, we are not making suggestions about sampling size and strategy, as the protocol will need to be elaborated collectively with SORALO, the Group Ranch leaders, and other partners. Nor do we propose a definitive questionnaire. We rather have created a checklist of questions to provide a background for developing a data collection protocol.
- Action research. This will happen automatically because this study is part of the process to develop a land-use plan for the Naroosura Group Ranch. If the advice and information in the report are not appropriate, this will be quickly uncovered in the land-use planning process and the conclusions will be adapted and corrected. The research team is closely associated with the team that is developing and implementing the land-use plan, and it is the intention that the research and land-use plan will inform each other.

Research questions to be addressed through questionnaire surveys

Agricultural potential and challenges

The report illustrates the importance of developing agricultural production in the area, as well as the risks associated with this development. These opportunities and pitfalls should be assessed more thoroughly. Below is a checklist of key questions that should be included in a questionnaire survey.

- How many acres of land do you cultivate?
- List your plots, indicating:
    - their size,
    - where they are located,
    - what was the use of the land before it was used for farming,
    - what you grow on these plots and what is the crop rotation,
    - whether the plots are irrigated,
    - whether you own, rent or borrow the land parcels or engage in sharecropping (explain the arrangement).
- Regarding tillage:
    - Do you mostly use a hoe, ox-plow, tractor?
    - Do you rent this equipment? Explain the arrangement.
    - What is the best option among these three tools?
    - Explain why you use the hoe, ox-plow or tractor.

    - Do you have a choice? What would you use if you had the choice? Why?
- For each plot (and for each crop rotation on that plot):
    - how much did you plant and harvest (detail all crops) during the last 12 months,
    - list all your inputs (chemicals, seeds, work, etc.) and associated expenses,
    - List all labour input, indicating whether you hire or use family labour (or both), and whether you adopt mutual aid (labor gangs),
    - List the main causes of crop losses (drought, pests, wildlife damages, diseases, etc). Detail the losses.
    - Do you use manure? Why?
- Where and how did you learn to farm?
- Who decides what to grow and how to grow your crops?
- Do you obtain advice? From whom? Is this good advice?
- Who does the work? Husband, wife, children, hired workers? What are the terms of the arrangements?
- How much do you invest in these activities? How do you obtain the money?
- When did you start to farm? Why? What were the main challenges?
- What are your future plans regarding farming?
- Is it easy to find land to farm? What are the options? What is your strategy?
- During the last 10 years, what were the main crop failure events? Explain. Detail your losses. How did you recover?
- During the last 10 years, what were the most successful harvests? Explain. Detail your economic benefits. How did you use the money?
- Do you raise livestock? What type? Approximately how many livestock do you own?
- What are the advantages and disadvantages of your farming activities in relation to your livestock activities? List them all and explain.
- List all the institutions that play a role in your farming activities: projects, NGOs, government bodies, associations, cooperatives, working gangs, farmer groups… Indicate the role played by these institutions, the way they help, the problem they create.
- What type of support would you like to receive for your farming activities?
- Are people from outside your community also farming? How do they obtain land? Do they represent a risk or an opportunity or both?
- What do you want to add that we did not ask? Please say whatever you consider is important to mention regarding your farming activities.

Carrying capacity and resources degradation

If all land is equally divided between each Group Ranch member, each household would only receive 30 acres. This report argues that pure pastoralism is no longer possible for all members of the Naroosura Group Ranch given the high population density reflected by that figure. The series of question below can help understand the extent to which this is true.

- How many livestock (mix of cattle and shoats) does one household (of 2 parents and 4 children going to school), need to own to sustain itself (i.e. pay for food, health care, school fees, clothes, and other necessities) if it does not have other sources of income and does not do any farming? How much cash would this family need every week for its daily expenses? How much cash

would it need for special expenses? List the special expenses (school fees, house construction, health care, etc.), and indicate their frequency and amount.

- In your case, based on the size of your household, how many livestock would you need if you did not have any other source of income? How much cash do you need every week for your daily expenses? And for your special expenses? What are these expenses? List the main expenses you had during the last 12 months.
- How many people depend on these expenses? List them and indicate they age and whether they are completely or partially dependent on these expenses.
- How many livestock do you need to sell every week or month to sustain your family for ordinary expenses?
- If subdivision took place and if you could only use 30 acres (the size that each Group Ranch member may receive) to feed your livestock, how many livestock could you feed during the rainy season on these 30 acres, assuming you can find additional resources during the dry season? How many livestock could you raise if you could not access additional resources during the dry season?
- If land is not subdivided, who will benefit more: those with many livestock, or those with few livestock?
- What are the possible strategies to access more grazing resources during the dry season after subdivision, if the 30 acres do not suffice?
- What are the advantages of subdivision for those with many livestock? And for those with few livestock? List them all and explain.
- When grazing land is communal, who decides when a given pasture can be accessed?
- When a pasture is open, is it accessed by all at the same time? Who accesses it first? Why?
- Are there any cases where some people exclude other people from communal pastures? How do they proceed? Why do they do that? Is it a new phenomenon? When did it start? What do people do about it? Who is included and who is excluded and why?
- Have you observed the disappearance of certain types of grasses? (or the appearance of other grasses) For each grass (or appeared) that disappeared:
    - What is the name of that grass?
    - How good is it for livestock?
    - Describe it.
    - Where did it grow?
    - When did it disappear?
    - Why did it disappear? Explain in details.
    - Did the community discuss this issue? What did it say?
    - Did the community do anything to prevent this? Why did it do?
    - What could have been done?
    - Could this grass come back again? How?
    - Can we still find this grass in some places? Where? How far away?
    - Overall, do you think the cause of its disappearance is changes in the climate (prolonged droughts) or grazing?
    - How do you cope with these changes?
- Do you promote certain grasses? Which ones? Why? How? Since when?

- Did you observe other changes in the pastures, like the proportion of certain grasses or their size? Explain what you observed. What do you think explains these changes?
- Do you think that subdivision will have an impact of the quality and type of pastures? Explain.

Appendix 2: Maps

Figure 1: Study site (Naroosura). The map also shows other sites (Loliondo, Ol'Kiramatian, and Maji Moto) where I-CAN conducted research scoping studies.

Figure 2: Closer view of the same study sites. The sites surround the Loita hills, Nguruman escarpment, and similar mountains in Tanzania, where the dominant land use is agro-pastoralism.

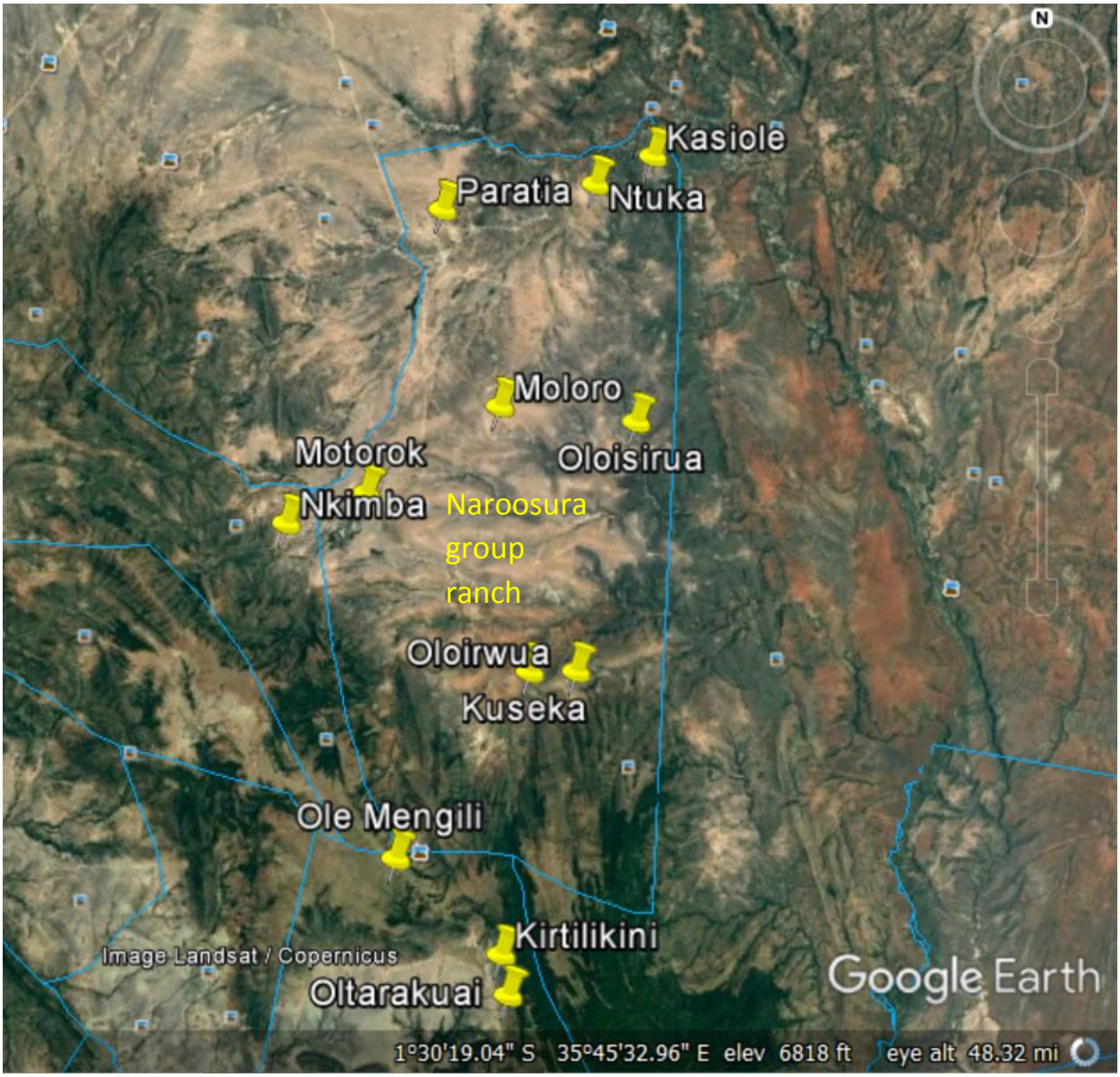

Figure 3: Cluster where interviews were conducted during the study. The blue lines are group ranch or other administrative boundaries. Kirtilikini and Oltarakuai at the bottom are outside Naroosura group ranch. They are Purko settlements in Morijo Division, in Loita. It is not clear whether Ole Mengili is part of Naroosura group ranch or Morijo Division (see Section 8).

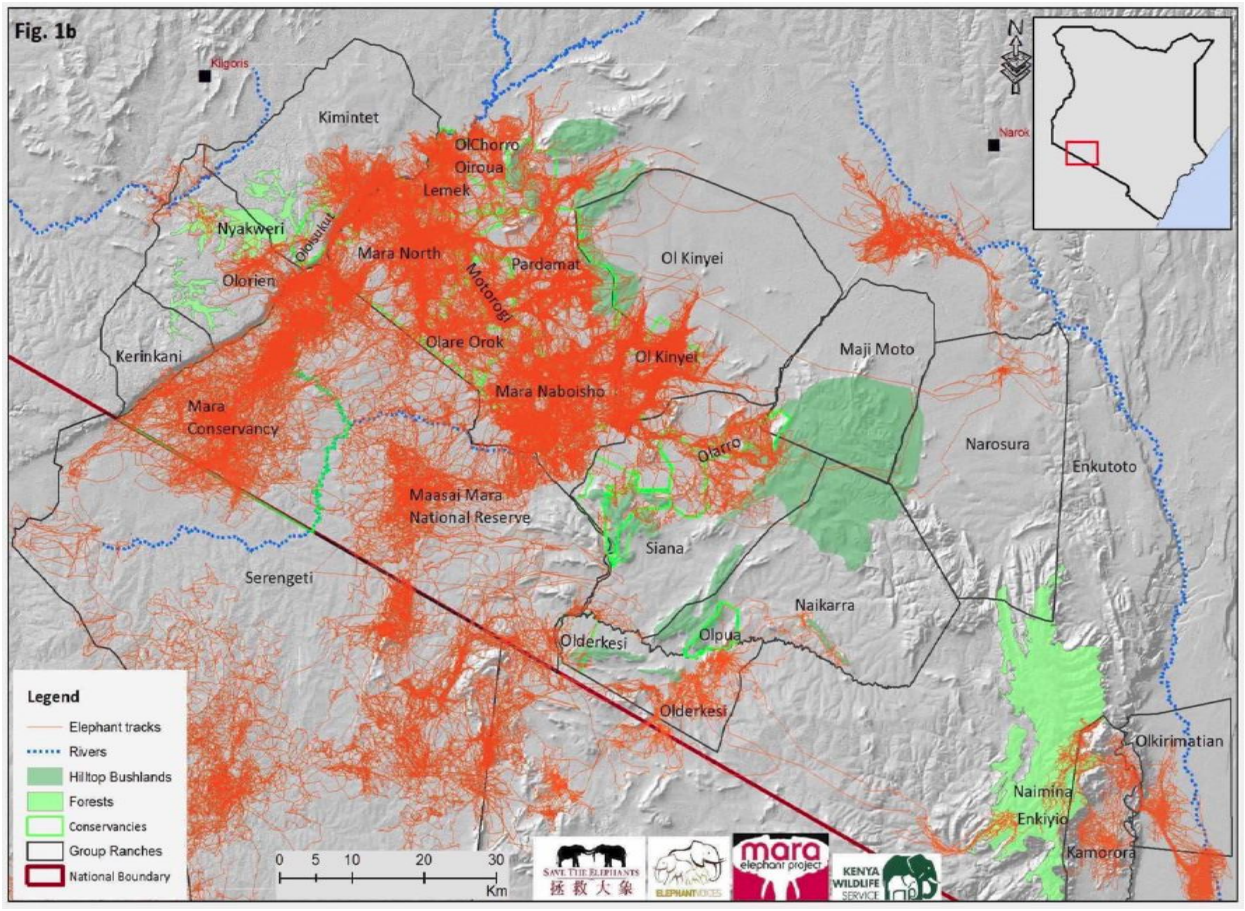

Figure 4: Elephants corridors. The wildlife corridor described by informants in Pariata and Kasiole matches with the elephant corridor that crosses Maji Moto and Naroosura, visible in the upper right corner of the map. Kasiole, which is said to be most impacted by wildlife, is located close to the red spot in northern Naroosura. Source: Save the Elephants 2016: Mara ecosystem connectivity: Information on elephant population status and movements for spatial planning and conservation in Narok County.

Appendix 3: Photographs

Photograph 1: Naroosura. We can see grazing areas in the foreground, cultivated fields, the town, and the Loita hills in the background.

Photograph 2: Cattle in the Loita plain, close to Naroosura, with the Loita hills in the background.

Photograph 3: Settlement in the plain, in Pariata. This land offers limited opportunity for agriculture, unless water harvesting dams are built, but offers abundant pasture for livestock during the dry season, especially for sheep, which graze it very intensively.

Photograph 4: Enclosure of Olokeri (dry season grazing area for weak animals) in Pariata. Individual households appropriate the best grazing areas for the weak animals, with tacit approval from the authorities. When they appropriate more than is socially acceptable, this can create conflicts. This is an example of ongoing shift in property rights regimes. It seems that the shift occurs progressively, when individuals dare to do things against the rules, until rules or norms are changed.

Photograph 5: Kasiole. This cluster is considered one of the poorest in Ntuka location. The bushy vegetation shelters carnivores and ticks which take a toll on livestock. Agriculture was tried but failed. There are only few places suitable for weak animals. People living in this cluster try to “book” land in other clusters with the hope of receiving it through the subdivision process.

Photograph 6: Wildebeest in the Loita plain (in Naroosura or Maji Moto). This is the most common species found in that wildlife corridor.

Photograph 7; ostriches in the Loita plain, in Naroosura group ranch.

Photograph 8: Dam built by the government in Moloroo. The purpose was to provide water for livestock but the dam is also used for irrigated cultivation.

Photograph 9: Plots irrigated by the dam pictured in Photograph 8 in Moloroo. The main crops are tomatoes, beans, and maize. About 20 households grow crops using the water from this dam.

Photograph 10: The intermediary zone in Koseka. We can see the Naimina Enkiyio forest, up the farthest hill, in the upper left corner of the photograph. The small forest patches in between the hill and the cultivated fields indicate springs whose water is captured for irrigation. The main crops are tomatoes, onions, corn, and beans. The land has been divided into slices that include cultivated fields and pastures like the one we can see in the foreground, which are thus individually appropriated

although livestock from other households is usually tolerated. The canal runs in between the fields and the pasture.

Photograph 11: Irrigation canal and tomato harvesting in Koseka, in the intermediary zone. Pastures in this area are mostly used for weak animals that do not migrate seasonally.

Photograph 12: Agro-pastoralist landscape in Oloirwua. We can see maize associated with tomatoes in the foreground, and various crops, including onions associated with beans, in the background.

Photograph 13: Kikuyu worker in Motorok. My assistant, on the left, will invest his earnings to hire him to grow tomatoes. They are discussing the deal. The tomatoes in the foreground have no commercial value and are used to produce seedlings.

Photograph 14: Head of irrigation canal in Oloirwua. Most streams are captured in small forest patches like this one.

Photograph 15: Cultivation along a canal in Oloirwua. Taro, a crop that requires a lot of water, is planted along the canal.

Photograph 16: Banana cultivation in Oloirwua. Banana trees are planted along streams and irrigation canals.

Photograph 17: Onions associated with beans in Oloirwua. The beans are planted on small ridges that separate the onion plots.

Photograph 18: Pastures and cultivated field in the highland. We can see the beginning of the Naimina Enkiyio forest in the top right cornet. The pastoral areas in the background is Osupuko Oiribi, one of the four clusters inhabited by Purko people but located in Morijo Location in Loita Division. Young men from Naroosura searching for pastoral and farming land settled there recently and there is discussion about removing them to use that area as a buffer zone.

Photograph 19: Agro-pastoral landscape in the highlands, in Ole Mengili. The area on the left used to be a forest and has been cleared for pasture and farming expansion.

Photograph 20: Agro-pastoralism in the highlands, in Oltarakuai. We can see a tractor plowing the land behind the fences. Tractors are based in Naroosura and are rented to work here since a few years ago.

Photograph 21: New field opened on a forest patch close to Ole Mengili, in the highland. The main crop will be maize.

Photograph 22: People of Naroosura after attending the meeting where we presented our results, in Pariata.

Appendix 4: List of interviews

I1: Informal discussion with SORALO staff and a land use planning expert from Maasai Mara University recruited by SORALO – Narok, December 2, 2016

I2: Assistant Chief and other leaders – Pariata, December 3, 2016

I3: A middle aged woman and her daughter – Pariata, December 3, 2016

I4: SORALO staff – Naroosura, December 4, 2016

I5: Old man – Pariata, December 5, 2016

I6 (Iteam): Our field assistant – Pariata, December 5, 2016

I7: Farmer with a dam – Pariata, December 5, 2016

I8: Woman, leader of women's group, and other women – Pariata, December 5, 2016

I9: Location Chief – Ntuka, December 6, 2016

I10: Group of middle aged men – Kasiole, December 6, 2016

I11: Location Chief (same as I9) – Ntuka, December 6, 2016

I12: Village Chairman and other men – Moloroo, December 6, 2016

I13: Elder involved in livestock project – Kuseka, December 8, 2016

I14: Group of women – Kuseka, December 8, 2016

I15: Man in the tomato business – Kuseka, December 8, 2016

I16: Oloiboni and other man – Kuseka, December 8, 2016

I17: Teenagers attending school, on holiday – Kuseka, December 8, 2016

I18: Young men cultivating tomatoes – Kuseka, December 8, 2016

I19 (Iteam): SORALO staff – Naroosura, December 9, 2016

I20: Leader of Olkonyil Purko people Association – Oltarakuai, December 9, 2016

I21: Manager of tourist camp and SORALO staff – Kirtilikini, December 9, 2016

I22: Representatives from Olkonyil Purko people Association, SORALO, and manager of tourist camp – Kirtilikini, December 9, 2016

I23: Old man, local leader in Osupuko Oiribi – Kirtilikini, December 9, 2016

I24: Group Ranch Committee member and other local leader – Oloirwua, December 10, 2016

I25: Assistant Chief and other leader – Oloirwua, December 10, 2016

I26: Leader in water Committee – Kuseka, December 10, 2016

I27: Group of middle aged men – Nkimba, December 10, 2016

I28: Kikuyu worker – Nkimba, December 10, 2016

I29: Local leaders – Ole Mengili, December 11, 2016

I30 (Iteam): SORALO staff – Naroosura, December 11, 2016

I31: Old man and local leaders – Oloisirua, December 12, 2016

I32: Group Ranch leader – Naroosura, December 13, 2016

I33 (Iteam): SORALO staff – Naroosura, December 13, 2016

I34: Representatives of various villages (attending final meeting for presentation of study results) – Pariata, December 13, 2016