PASTORAL LAND TENURE SERIES Nº 6

Property Concepts, Herding Patterns and Management of Natural Resources among the Ngorongoro and Salei Maasai of Tanzania

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IIED
INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT

DRYLANDS PROGRAMME

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This series is funded by grants from the Swedish Agency for Research Cooperation with Developing Countries (SAREC) and the Norwegian Agency for Development Cooperation (NORAD) in support of the Drylands Pastoral Land Tenure in Africa Programme.

IIED, 1994

ACKNOWLEDGEMENTS

During the course of my research I was assisted by Maasai interpreters in conducting semi-structured interviews with pastoralists, among which were representatives of the traditional Maasai leadership. Separate interviews with women took place in a few localities. My Maasai research assistants and interpreters were Peter Ole Metele, Gaspar Leboy Ole Maigisa and Peter Makutian in the Ngorongoro Conservation Area (NCA), and Lazaro Ole Kosyando and Elisha Ole Moita in the Malambo/Salei area. I also talked with representatives of the Ngorongoro Conservation Area Authority (NCAA) and to Ngorongoro District leaders asking for their opinions on a number of issues. I found their comments and opinions most useful; however, I take full responsibility for the conclusions expressed in this report.

My research was made possible thanks to research grants from the Pastoral Land Tenure Programme of the International Institute for Environment and Development (IIED) in London. Additional grants were received from the State Committee for Scientific Research and the Department of Ethnology and Cultural Anthropology at the University of Warsaw in the Republic of Poland. While in Nairobi, I was offered accommodation and access to facilities by the British Institute in East Africa. I gratefully acknowledge the assistance of these institutions.

I am also grateful to Kemal Mustafa for his careful editing of the original text.

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GLOSSARY OF MAASAI TERMS

engelata (or *ewoloto*)	Clan-based redistribution (allocation) of cattle among impoverished fellow-clansmen; decision is taken at a formal meeting
engobiro, pl. *ingobirr*	Appointed assistant of the "spokesman" responsible for a certain area with several localities
enkang, pl. *inkangite*	Homestead made up of one or more family units
enkigwana	Meeting of adult men of a given locality; political forum for making all important community decisions
enkutoto, pl. *inkutot*	Locality (Maasai village), also local community
enkutoto osumbat	Semi-permanent settlements
iingolin	A viral disease transmitted to smallstock by wildlife (e.g. Grant's gazelles)
ingatee	Malignant Catarrhal Fever (MCF); a viral disease transmitted to cattle by wildlife (e.g. wildebeest)
inkishu enkaputee	Bridewealth
ndimi	Forest
olaiguenani, pl. *ilaiguenak*	"Spokesman" of the age-group chosen for his life-time; "political" leader of an age-group in a given section
olgilata, pl. *ilgilat*	Clan, a group of people who recognise descent from the same (mythical) ancestor
oloiboni	Ritual expert, prophet, spiritual leader of section

oloirishirsha	A zone of intermediate features with respect to vegetation, climate and risk of tick-borne disease situated on the slopes of high mountains (e.g. Ngorongoro)
olokeri	A section of pasture close to the locality reserved for calves, sick animals and sometimes smallstock. It is supposed to be used by members of that local community only, unless they authorise others. Salei Maasai word. However, the term *olopololi* is used by the Purko and Loita Maasai to describe the same feature
olomilo	Bovine Cerebral Theileriosis (BCT); a tick-borne disease
olosho, pl. *iloshon*	Maasai sub-tribe, section, political unit of the highest order, e.g., Kisongo, Salei
olporor, pl. *ilporori*	Age-group
oltigana	East Coast Fever (ECF); a tick-borne disease
orpurkel	Lowland short-grass pastures (e.g. Salei or Serengeti plains)
osupuko	Upland pastures with medium and high moist grasses (e.g. Ngorongoro Highlands)

I. INTRODUCTION

Abstract

The Maasai regard all range resources to be their collective property. However, different rights apply to land, water and livestock. Within the notion of collective property, the Maasai recognise different kinds of rights. Access to resources is often determined by negotiation between primary and secondary rights holders. Small pieces of land within the common may also be privatised, if other 'co-owners' agree. Property rights to water may be individually 'owned', but rights of access are nearly always collective in practice. Individuals 'own' cattle, but clan leaders have the right to allocate cattle to families in need. Secondary user rights are reinforced by networks of social relations and can become formalised when frequently exercised. Ecological considerations as much as property rights determine the migratory pattern of pastoral land use. However, whereas herders were once able to fully maximise the productive potential of highland and lowland pastures according to seasonal conditions of forage and the availability of water, they are today constrained by an increase in the risk of diseases, and a breakdown in security due to cattle raiding. Greater livestock productivity could be attained through a reduction in disease risk factors and the expansion of the area available for grazing through development of strategic water sources and affirmation of rights of access to the forest zone.

Research Aims and Methods

The paper has two major aims. The first is to describe a model of property rights in relation to land, water sources and livestock as it operates among the Ngorongoro and Salei Maasai. The second is to show how this land tenure model works in practice for the Ngorongoro Maasai. This analysis forms part of a more extensive study of the pastoral economy, ecology and mutual assistance mechanisms among the Ngorongoro and Salei Maasai of Tanzania.[1]

[1] Potkanski, T. (1994) *Pastoral Economy, Property Rights and Traditional Mutual Assistance Mechanisms among the Ngorongoro and Salei Maasai of Tanzania*, IIED, Pastoral Land Tenure Monograph Series No. 2.

The discussion of pastoral ecology refers frequently to a recent book by Homewood and Rodgers, 'Maasailand Ecology: Pastoralists, Development and Wildlife Conservation in Ngorongoro, Tanzania', which provides a systematic description of the main elements of the Ngorongoro ecosystem. Homewood and Rodgers have carefully cross-checked and evaluated data from their own and others' research and from existing literature to arrive at well formulated conclusions on current management options (1991).

This paper is designed to complement their work and provide additional information on the pastoral economy from the perspective of the Maasai themselves. It is my intention to update their findings with quantitative data on household economy, herd performance, herd conditions, and food and livestock sharing. This data was collated from a survey of household economy with the help of a group of Ngorongoro and Salei Maasai.

Previous studies and reports prepared for the Ngorongoro Conservation and Development Project (1987-1990) have concentrated on the Ngorongoro Maasai without considering the Salei plain Maasai. In my opinion, this is a serious oversight, as it prevents a thorough examination of the social components of the Ngorongoro-Salei-Serengeti ecosystem. The findings of the fieldwork, exploring the inter-dependency of the Salei Maasai and the Ngorongoro Maasai, outlined in this paper will, it is hoped, fill a gap in the existing literature.

Although the Maasai system of customary property rights to resources (land, water, livestock) appears to be well researched (Jacobs, 1965; Galaty, 1981; Århem, 1985; Talle, 1988; Ndagala, 1990; Kituyi, 1990; Galaty, 1991; Kituyi & Kipury, 1991), it has only been described either partially or in general terms.

In this paper, the intention is to analyse the whole system,[2] showing how it works in practice. It is argued that resources are inter-related by demonstrating that property rights in land, water and livestock are but sub-systems of an overall pattern of property relationships. This approach is justified because the Maasai have a common conceptual framework through which property relations operate. The main thrust of the analysis is the distinction between individual and collective rights to basic resources. An analysis of herding migration is given not only as an outcome of a rational grazing strategy, but also as a

[2] However, a description of mutual assistance mechanisms is left to the more comprehensive study as it requires a more thorough description of pastoral economy in the area.

function of collective property rights to land and water. Every individual herder constantly plays a "game" with other herders which is constrained by customary rights to resources and by the local environment. The resulting strategies are seen as the aggregate outcome of individual decisions.

Property rights in cattle are briefly analyzed in terms of the collective rights of clan members which provide for the redistribution of livestock to impoverished fellow-clansmen. This can be understood as a system of mutual assistance as well as a manifestation of collective rights in "clan cattle". Clan-based redistribution of livestock is a basic element of the traditional safety-net which is reinforced by an individually based network of livestock and food sharing. This has, to date, escaped serious investigation in the literature on the Maasai. Homewood & Rodgers (1991) and McCabe, *et. al.* (1989) showed an interest, but concentrated more on food sharing. Århem mentioned the possibility of clan-based livestock-sharing:

> "Patrilineal clanship ... also forms a basis for allocation of diffused rights in livestock owned by fellow-clansmen; clansmen are expected to help each other build up herds for future marriages and in situations of individual misfortune." (1981).

Other accounts in the literature (Jacobs, 1965; Bekure, *et. al.*, 1991) are equally general.

It is intended to demonstrate that property rights in rangeland, water resources and livestock form a coherent system which can be best described by common property resource management theory. The integrity of this system enables the Maasai pastoral economy to adjust flexibly to ecological and economic constraints. Any rapid change within one of the various elements can place the whole system in jeopardy.

One of the conclusions of the field research is the urgent need to organise a broadly based development project aimed at rebuilding the pastoral economy of the Ngorongoro Maasai, if they are to remain pastoralists. This conclusion, treated at greater length in a forthcoming study, is reinforced by statistical data on herd performance from a sample of Ngorongoro and Salei Maasai, and is in agreement with the current management policy of the Ngorongoro Conservation Area Authority (NCAA) and the Ngorongoro District Council.

It is recommended that an in-depth investigation be carried out of indigenous concepts of property rights with regard to resources in times of plenty and in

times of scarcity. This should be an integral part of development planning which aims to work with the "target population". It is hoped that this paper will contribute to this process in Ngorongoro.

Research Setting

General Description of the Local Ecology

The research area covers the Ngorongoro Conservation Area (NCA) and the Salei plain lying to the north of it. Both areas are in Ngorongoro District of Arusha Region of Tanzania (see Map 1). From the ecological point of view, the NCA, the Serengeti National Park and its adjacent rangelands, together with the Salei plain, belong to the greater Serengeti-Ngorongoro ecosystem. These vast open plains, highlands and depressions are inhabited by some three million migratory ungulates, and are also the home of more than 22,000 indigenous pastoral Maasai and their livestock.

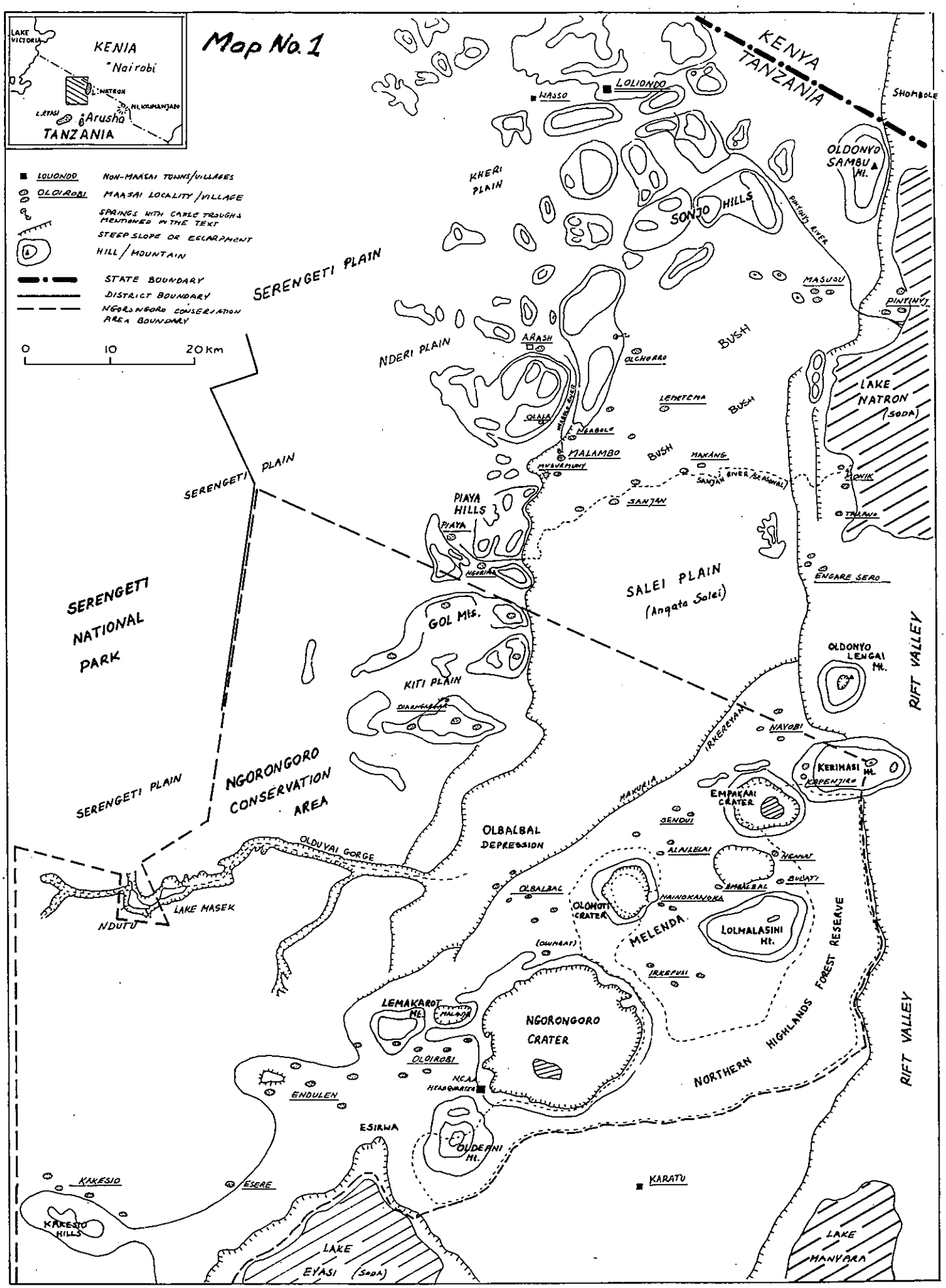
According to the latest available livestock census (Perkin, 1987), there were 137,390 cattle and 137,389 smallstock in NCA. If smallstock are converted into cattle equivalents, this gives a cattle to human ratio of just over six cattle per capita. According to the findings of this study in 1991-92 based on a limited statistical sample, this ratio has recently declined significantly.[3]

The NCA covers 8,290 square kilometres, 59% of the total area of Ngorongoro District, stretching from the eastern fringe of the Serengeti plain in the west, to the edge of the Gregory Rift in the east (see Map 1). To the southwest it reaches the shores of lake Eyasi, and its northern border cuts through the Gol mountains and the Salei plain to mount Kerimasi at the edge of the Rift Valley.

The Salei plain, together with the bush and wood covered area of its northern reaches, covers another 1,500-2,000 square kilometres. The latter borders the NCA from the south and from the north is surrounded by the Purko hills (Lamunyani and Naysoya massifs) and the Sonjo hills. The Gol mountains and the Piaya hills form its western border, while the Rift Valley forms the eastern border. The whole study area is ecologically extremely diverse and can be

[3] This issue is extensively discussed in Potkanski, T. (1994). The arguments are also summarised in Potkanski, T. *Proposed Scenario for the Integrated Ngorongoro Development Programme*, IIED, forthcoming.

General Topographical and Political Map of the Ngorongoro Conservation Area and the Salei plain



subdivided into five broad geomorphological units containing different features (Homewood & Rodgers, 1991).

1. The **Crater highlands** cover the central and eastern part of the region. This is a vast volcanic massif with several calderas (Ngorongoro in the central part and Olomoti and Empakaai in the eastern part), and a high plateau between them. Other mountain peaks are Lemagarot and Oldeani in the central region, and Lolmalasini and Kerimasi in the east. The last active volcano in the area, Oldonyo Lengai, lies just north of the NCA border, at the edge of the Salei plain and the Rift Valley. The whole region covers about 2,700 square kilometres.

The main types of vegetation are montane forests and highland woodland. The plateaux are covered with tussock grassland and medium and short grasses. The Ngorongoro highlands, especially the Northern Highlands Forest Reserve (NHFR), are an important water catchment zone, from which many perennial streams originate. However, most of them flow into the Rift Valley and are not accessible to the plains.

2. The **Salei plain** forms a narrow corridor between the Crater Highlands and the Gol mountains, covering some 700 square kilometres within NCA. It continues to the north into Sale division of Ngorongoro district, where it extends for another 1,500 square kilometres. Its southern and central parts are covered by short-grass open savanna, while the northern parts around Malambo, Olchorro and Masusu are covered by bush and medium high grass with woody vegetation.

The area is characterised by shallow, light soils covered with volcanic ash. The only permanent water sources are the Pinyinyj river in the northern most part of the plain (in the bush and woodland savanna covered Masusu area), and two or three springs in the Malambo-Olchorro bush. The open plain is devoid of permanent sources of water, although during the rainy season water is available from open pools and seasonal rivers, such as the Sanjan.

3. The **Gol mountains** are a group of irregular hills, stretching west to east, parallel to each other, in the northern part of NCA. Part of the Gol mountains lie outside NCA in Sale division of Ngorongoro district. Their maximum altitude reaches 2,200 metres, which is about 500 metres above the level of the surrounding plains. The whole area covers roughly 700 square kilometres.

The different hill ranges are interspersed with plains covered by short grass. Hilltops are covered with short grass, but slopes are usually covered with bushy vegetation. There are several permanent sources of water; springs and wells - all of very limited output that do not satisfy the needs of local pastoralists during the dry season.

4. The **Serengeti plain** occupies the western and southwestern part of NCA. It extends westwards into the Serengeti National Park. It is covered by short grass. Water is available from springs around the alkaline lake Ndutu, from dams and wells on the seasonal Olduvai river, and from shallow wells in seasonal stream-beds on the open plain. These sources do not, however, satisfy the needs of the pastoralists in the dry season.

5. **Kakesio hills** and **Eyasi escarpment** occupy the southern part of NCA. The area stretches from Endulen below mount Lemagarot along the Rift Valley escarpment passed lake Eyasi to the Kakesio hills. It is a diverse region, covered by medium high grass and woody vegetation in the Endulen area, short open savanna in the area bordering the Serengeti plain, and bushland along the Eyasi escarpment and in the Kakesio hills.

In the Endulen area, water is easily available from several permanent streams flowing from mount Lemagarot to lake Eyasi. Along the Eyasi escarpment, water is available from several springs, while in the Kakesio area there is a serious shortage. During the dry season, water is available only from shallow hand dug wells in dry riverbeds, or from artificial pools or dams constructed on the plain.

The altitude within these five zones varies from 3,000 metres on the Crater Highland peaks, to 2,100-2,800 metres on the highland plateaux, and 1,500-1,700 metres on the Salei and Serengeti plains. The Rift Valley floor lies at an altitude of about 1,000 metres. The different types of vegetation, from the point of view of pastoral grazing strategies, are described in Section III.

Rainfall is highly seasonal and variable. The year is broadly divided into a dry season from June to November/December, and a rainy season from December/January to May. The eastern slopes of the Crater highlands (Empakaai, Olomoti, NHFR) receive over 1,000 mm per annum. This decreases to 800-1,000 mm per annum on the plateaux (Nainokanoka) and in the Endulen zone, and to below 600 mm per annum in the rain shadow area of the Serengeti and the Salei plains. Rainfall in the highlands is usually regular, but on the

plains, the unpredictability of rainfall has a detrimental affect on the pastoral economy.

This has been especially evident in recent years. During the wet season of 1990, there was significantly more rainfall than usual, but the following dry season was extremely long; while the wet season of 1991 was short with little rainfall both in the lowlands and in the highlands.[4] The wet seasons of 1992 and 1993 were also shorter and drier than expected.

Table 1 presents rainfall data from recent years, together with the average values for previous decades.

Table 1. Rainfall within the NCA/Salei Area

Locality	**Altitude [metres]**	**Mean Value 15-23 years** (a) (millimetres)	**1990** (b)	**1991** (b)
Ngorongoro Crater (Lerai)	1,750	N/A	870	500
NCA Headquarters	2,350	837	1,454	661
Nainokanoka	2,600	933	913	896
Empakaai Crater	3,100	1,733 (c)	N/A	N/A
Endulen	1,850	914	1,598	1,216
Kakesio	1,700	515 (c)	790	335
Olbalbal Depression	1,500	400	710	227
Serengeti (Olduvai)	1,580	433	635	196

(a) Århem (1981), based on the Directorate of Meteorology, Dar es Salaam.
(b) NEMP, *Annual Report*, 1990 & 1991.
(c) Mean Values for 1977-79 after Makacha (1980), cited in Århem (1981).

[4] Ngorongoro Ecological Monitoring Programme (NEMP), Annual Reports 1991 and 1992.

Maasai Customary Social and Political Structures

This report looks at the Salei Maasai and the Ngorongoro Maasai, or more specifically, the inhabitants of the Salei plain, the Ngorongoro highlands and the surrounding plains within the administrative borders of NCA. Neither term refers to the broader traditional Maasai political units, such as the "Salei section" and the "Ngorongoro (Oldonyo Laltatwa) sub-section of the Kisongo section", since members of both these customary units (sections) live mixed together in both geographical areas.

According to the latest population census (1988 National Population Census), there are 24,722 Maasai in Ngorongoro Division (excluding NCAA staff). The population of Malambo village on the Salei plain is approximately 2,960 persons, and that of Pinyinyj and Masusu 3,503.

The traditional political division into independent units, known as sections or sub-tribes (*olosho*, pl. *iloshon*), is found to this day, although their functions changed in the early part of this century from political and military to primarily symbolic and ceremonial. Even the usual attribute of a section having a fixed territory with defined borders is no longer valid in the wider Ngorongoro area, where members of the Ngorongoro sub-section of the Kisongo section, the Salei section and to some extent the Serenget section, live mixed together. Nevertheless, the customary boundaries of different sections are still remembered. There are around 20 sections of different sizes throughout Maasailand in Kenya and Tanzania. The largest is the Kisongo section, which is divided into different sub-sections, such as the "Oldonyo Laltatwa", who are referred to in this paper as the Ngorongoro Maasai.

Maasai traditional social structure is based on clans and age-groups. There are seven patrilineal clans (*olgilata*, pl. *ilgilat*) among groups who recognise descent from the same putative ancestor. Clan-mates have very strong mutual aid obligations, such as a duty to share cattle in cases of hardship. Cattle, though individually 'owned', belong to all members of the clan. This ideological belief, emphasizing the unity of the clan, is practised through the institution of clan-based redistribution of cattle, known as *engelata*, which will be described later in this paper.

The unity of the clan is symbolised by the fact that cattle of clan-mates have the same basic brand (with each herder adding his sub-clan and personal brands). Members of all clans are dispersed throughout the whole of Maasailand, so in

each given locality, one can find people belonging to all seven clans, though some have fewer members than others.

The second basic institution constituting social structure is that of the age-group (*olporor*, pl. *ilporori*).[5] Members of each section are organised into age-groups as warriors, junior elders, senior elders, and retired elders. The senior elder age-group used to take responsibility for preserving peace and order within society. A thorough description of the Maasai age-system can be found in Spencer (1988). For the purposes of this paper all that needs to be acknowledged is that every age-group elects a 'spokesman' (*olaiguenani*, pl. *ilaiguenak*), responsible for organising meetings to make important decisions. The spokesman also acts as the executive authority in solving simple everyday problems.

To achieve this, he appoints a number of local representatives, or assistants (*engobiro*, pl. *ingobirr*), one for each sub-area perceived as an independent local political unit, which usually includes neighbouring localities. Each 'spokesman', together with his assistants, deal with matters concerning members of his age-group. However, the 'spokesman' of the senior elders is considered the political representative (in a traditional sense) of the whole section. At the local level the *engobiro* of the senior elder age-group plays the same customary administrative role. Important decisions at every level are always made collectively in meetings of elders, called *enkigwana*.

Although nearly all the political and administrative functions of age-sets have been usurped by government, age sets still provide an important structure for internal socio-political relations, and could be complementary to the modern administrative structure.

Modern Administration

From the administrative point of view, the NCA is in the Ngorongoro division of Ngorongoro district. It is sub-divided into four wards (Nainokanoka, Ngorongoro, Endulen and Kakesio), all inhabited by Maasai. The Salei plain is part of the Sale division within the same district, and is sub-divided into five wards, of which only Malambo and Pinyinyj are inhabited by Maasai. The other three wards are inhabited mainly by Sonjo agro-pastoralists.

[5] In the area studied, age-groups have became functionally equivalent to age-sets (*olaji*, pl. *ilajijik)*, and therefore this term is not used in this Report.

Modern administrative divisions closely follow traditional Maasai political units. The main difference lies in the changed affiliation of the Maasai from the Piaya area who traditionally belonged to the "Oldonyo Laltatwa" sub-section (Ngorongoro or IlKoronkoro). Under modern administration they now belong to the Sale division of Ngorongoro district. Similarly, the Serenget Maasai (an independent section) who once inhabited the Serengeti area, have since 1959 lived within the borders of NCA. Table 2 presents a comparison of both structures.

Table 2. Comparison of Modern and Traditional Political Units

Modern Administrative Division	**Traditional Political Units**
Ngorongoro Division (NCA)	
Nainokanoka ward: Villages of Irkepusi, Sendui, Nainokanoka, Alailelai, Bulati, Embalbal, Nayobi, Kapenjiro	The same area but known as "Melenda"; part of the "Oldonyo Laltatwa"
Ngorongoro ward: Villages of Oloirobi, Olbalbal and the Gol mountains	The same area but known as "IlKoronkoro" and including the Piaya area; part of the "Oldonyo Laltatwa"
Endulen ward: Villages of Endulen and Esere	The same area also known as "Endulen"; part of the "Oldonyo Laltatwa"
Kakesio ward: Localities scattered around the Kakesio hills inhabited by the Serenget Maasai, who were evicted from the Serengeti National Park in 1959	The independent section of the Serenget Maasai until 1959
Sale Division	
Malambo ward: Villages of Malambo and Piaya	The same area excluding the Piaya area; part of the Salei section
Pinyinj ward: Villages of Pinyinj and Masusu	The same area; part of the Salei section
Sale, Digodigo and Oldonyo Sambu wards: All inhabited by the Sonjo	The same area

As we can see from Table 2, at the local level, the modern administrative division closely reflects traditional political units. The latter is maintained in religious life and for the purpose of the traditional ceremonial cycle based on the age-system. However, it could also be easily used for development purposes, in conjunction with the modern administrative structure.[6]

II. THE SYSTEM OF PROPERTY RIGHTS TO RESOURCES

Although Maasai customary property rights to resources, including land, water and livestock seemed to be well researched (Kituyi & Kipury, 1991; Kituyi, 1990; Ndagala, 1990; Talle, 1988; Århem, 1985; Jacobs, 1965), these descriptions are usually either too general or only deal with certain aspects of property. In this study, equal attention will be paid to an analysis of all three types of property, showing how they are dealt with in practice, and arguing that they are inherently inter-related.

Consequently, property rights in land, water and livestock will be treated as set within the broader sub-systems of one system of property relationships in society. This is justified as the Maasai use a common conceptual framework for managing these various assets in their daily practice. The main basis for this description will be the distinction between individual and collective rights in basic resources.

Terminology

The concept of property rights is complex and pertains to rights of possessing, using, and disposing of a thing or resource. In the context of social relationships, property rights;

> "do not refer to relations between man and things, but, rather, to the sanctioned behavioral relations among men, that arise from the existence of things and pertain to their use" (Furobotn and Pejovich, 1972:1139, cited in Behnke, 1985).

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[6] For accuracy and cross-checking, use is made of the Maasai terms for different areas whenever possible.

Baxter describes them for pastoralists as:

> "Rights in property, land, stock, grazing and browse, water, trees, honey and other gathered products are at the core of economic life and hence of social relationships" (Baxter, 1990:iii).

The concept of 'ownership' is understood here as an exclusive right to possess, use and dispose of a thing, which can be vested in an individual or collectively held and exercised by a group of persons (co-owners).

Here it is assumed that there are three types of property:

1. **Individual**, freehold property, characterised by individual access and hence low costs to the owner of excluding other potential users from consuming the property;

2. **Collective** or common property, characterised by controlled access by the given user group within which the costs are high of exclusion of some of its members from their rights to consume the property;

3. **Public** or open access property, such as sunlight and fresh air, which is open to all interested users and freely appropriated or consumed by them.

The category of 'state property', existing in Tanzanian statutory law, is subsumed here under collective or common property. However, the whole question of the relationships between the state and the Maasai, in terms of statutory rights and deemed rights, will not be analyzed here. Focus will be given to an analysis of the relationships between the rights of different Maasai groups over the use of local resources.

The term 'collective property' will be used in this study instead of the term 'common property'. Collective property will refer to property owned and controlled (in terms of use, possession and disposal) by a group of users. When this group is clearly a local community, the term 'communal property' will be used to emphasise the fact that this set of property rights is primarily vested in and exercised by a community. Individual property is controlled by an individual. The category of public (open access) property is in practice not relevant to the analysis of the management of basic resources by pastoralists.

Although Hardin's infamous argument about the 'tragedy of the commons' pertains to public property, he misleadingly attributed it to the situation of

pastoralists (Hardin, 1968). Unfortunately, this error provided the justification for an anti-nomadic perspective in the evaluation of the environmental consequences of collective range use by pastoralists, and in development planning with respect to the pastoral sector (Lane, 1990; Ellis & Swift, 1988; Sandford, 1983).

Basic resources in pastoral areas, such as land and water sources, belonging to the category of collective property, have been confirmed by several empirical studies (Lane, 1990; Swift, *et. al.*, 1984). In this study it is argued that this is also the case for livestock, and consequently that cattle sharing or clan-based redistribution can be understood as a way of managing cattle as a collective resource.

From the analytical point of view, rights to basic resources are very similar in both their form and content. In all three cases, individual and collective rights exist side by side, although in different proportions with respect to each type of resource.

If we place these three kinds of basic resource on a continuum of property rights, ranging from the purely individual free-hold property, through collective (controlled access) property, to public (open access) property, all of them will be found to lie between the two extremes. Rights in livestock are closest to the individual pole, though in certain circumstances their collective aspect is clearly seen, as in clan-based redistribution among impoverished clan members.

Property rights in water are either individual or collective, but rights of access are nearly always collective in practice. Rights to land are collective in principle (i.e. vested in all Maasai), but there is an informal gradation of rights of access in favour of members of a local community, usually linked to communal rights to water sources. It is even possible to privatise small pieces of land within collective property, if other co-owners agree. In general, all these property relationships are always made operational through negotiation. This is, however, rarely of a direct and open nature, or conducted on the spot.

In the description which follows, the concepts of 'primary' and 'secondary' user groups and rights will be used in relation to the group of 'collective owners'. This will help to reveal the hidden competition for resources within the group of 'collective owners'.

The primary user is an individual or group, who, in everyday circumstances, is the user of a certain resource, usually due to relative proximity of immovable

resources, such as range and water, or to their exercising direct everyday control over the resource, as in the case of cattle. However, in clearly defined and socially understood 'emergencies', they have to share this resource with those who belong to a 'secondary user group'.

The distinction is therefore primarily concerned with the frequency of use, although this unavoidably generates claims by 'primary users' to have greater rights, and hence control over the resource. This is despite the fact, which is clear to all, that the resource is collectively owned and access by the 'secondary group' cannot ultimately be denied.

A useful theoretical framework for analysing the way in which pastoralists manage their basic resources is the theory of common property resource management. The definition of a broad category called 'common' or 'common pool resources' is:

> "a natural or man-made facility that produces a flow of use units per unit of time (or several flows of different types of use units) where exclusion from the resource is difficult to achieve and the resource can be potentially utilised by more than one individual or agent, simultaneously or sequentially....
>
> "A user group is a set of individuals that makes (or has claims to make) use of a particular common pool resource. A user group may live in or nearby the common pool resource (which itself may shift locations), or live far away and travel to the resource to harvest use units" (Ostrom, 1986:604/607).

Runge (1986) argues that where a community has a low income and is critically dependent on a local resource base, and at the same time faces a high degree of uncertainty with respect to the availability of those resources, then collective forms of management are cost effective and efficient, by allowing temporary access to 'others'' resources, and acting therefore as a safety-net. This inductive theoretical conclusion is in agreement with emerging mainstream thinking in range management science, for example, where the work of ecologists is demonstrating the ecological rationality of pastoral strategies in the non-stable dryland ecosystems (Ellis and Swift, 1988).

One of the theoreticians of 'collective action' asserts that:

> "if members of some group have a common interest or object, and if they would all be better off if that objective were achieved, ... they would, if they were rational and self-interested, act [collectively] to achieve that object" (Olson, 1965:1).

However, this only happens:

> "... if the number of individuals is small, ... or if there is coercion or some other special device to make them act [together]"(ibid: 2).

Olson (1965) challenges the presumption that the possibility of receiving benefit for a group would be sufficient to generate collective action to achieve it. Runge (1986), by contrast, defines the conditions of cooperation. He argues that when the decisions made by individuals are based on the anticipated decisions of others (in this case the expectation of reciprocity), and people have a chance to learn what others have decided and can alter their own decision before the 'next round of the game', then the rational strategy is to cooperate, on the condition that others will cooperate.

Rules of ownership and access to pastures

The Maasai often declare they can graze anywhere they choose within 'Maasailand'. This general ideological statement refers to the culturally grounded notion of land as the collective property of all Maasai. It also reflects the common ecologically based wisdom that fencing of pastures and limits on livestock movement both undermine the flexibility of arrangements, and act against the logic of sustainable pastoral production in the dryland zone.

In practice, collective use of rangelands is made possible by constant informal negotiations between primary and secondary users. Despite the ongoing nature of these negotiations, the 'rules of the game' are stable in principle, which allows the participants to discern the main patterns and learn which strategies are successful and viable.

In the following model of the property rights to land reference will be made to open range (for grazing) as well as to bush (for browsing). Trees, at least in the Ngorongoro/Salei area, are treated together with the land on which they grow. This means they are either the collective property of all the Maasai when

growing in the bush far from permanent settlement, or they are restricted access communal property if growing within special reserved pastures for calves and smallstock. The latter are situated nearby, and 'controlled' by local communities (*inkutot*). It should be added that pastoral settlements are usually located close to areas with woody or bushy vegetation and reserved pastures are delimited in such a way as to enclose especially valuable tree resources in the area, which are then used in the dry season for feeding smallstock.

Each local community is customarily attached to a certain area where they have their most permanent settlement, either for the dry season or the wet season. Sometimes, in their migrations, they move for several months outside this area, either leaving part of their families or else moving altogether. This depends on the structure of the family and the herd, and may change from year to year. Nevertheless, they are widely recognized as belonging to one particular place, while in other areas and localities they are only considered visitors, even if they visit every year.

Such association is primarily ecological. The Maasai settlements are usually situated in areas where there are permanent sources of water, good grazing and browse resources. Therefore, the areas with good pastures on the slopes or in the bush, are permanently inhabited. The vast areas of open plain, which are only used seasonally due to lack of water and where permanent settlements are not built, are the extreme case in this model. They have several user groups who make use of the abundant, though strictly seasonal, resources side by side without any competition. Some of the grass resources on the short-savanna open plain are even left unused due to lack of water.

The model of Maasai land tenure as it operates in the Ngorongoro and Salei area is outlined below.

1. At the broadest conceptual level, all pastures belong to all Maasai. However, in practice, local communities (a locality - *enkutoto*, or a group of neighbouring localities) have **primary user rights** to pastures within their customary area or nearby for both grazing and browsing.

2. Nevertheless, should there be an emergency, the local community which has primary user rights must offer access to its grazing and browse resources to all other Maasai. This assumes that resources such as grass or water have been exhausted and so people have been forced to come to other areas (as in the case of Olbalbal below). By accepting this rule, the Maasai subscribe to the ideological principle of land as the collective property of all. This is also what

Maasai mean when they say they can go wherever they want. We will see, however, that this is a case of 'controlled access collective property'.

3. Visitors' rights can be institutionalised. Where seasonal visits are repeated frequently, this visiting group will start to acquire customary **secondary user rights** to that pasture area. As the ecological situation is relatively stable in much of 'Maasailand', these arrangements have a somewhat permanent character. Thus, in practice, each local community has primary user rights to a certain area (to which it is physically attached) and possesses secondary user rights to some other areas of pasture. Such secondary user rights are stronger in some areas than in others. A particular herder must plan the migration routes of his herd each year. His identity is known throughout the area, as are also his user rights to distant pastures. As a result, there is no need to ask local people for permission to graze. Maasai informants, when asked if they need permission to use others' pastures, will vigorously deny this. They are correct, since their rights are institutionalised.

4. However, if the migrating herders are first time visitors, they have to consult the local community directly, calling a meeting and asking for permission. In practice, this rarely happens, because of the relatively stable migration routes. It may happen once or twice a decade in cases of localised droughts or epidemics. This happened with herding movements between Tanzania and Kenya in the 1970s drought. However, this mainly concerns larger groups of herders with cattle, as individual herd owners will probably by-pass this option, using instead the institution of lending stock to close kin or friends, which legitimizes the presence of such cattle in non-customary pastures.

5. Mutual, reciprocal rights of use (secondary user rights) are not restricted to the area of *olosho* (section - the broadest customary political unit in 'Maasailand'), but rather to a broad ecologically self-sustaining unit, which may encompass adjacent areas belonging to different sections. This finding in Ngorongoro is contrary to some assertions in the literature (Ndagala, 1990; Talle, 1988).

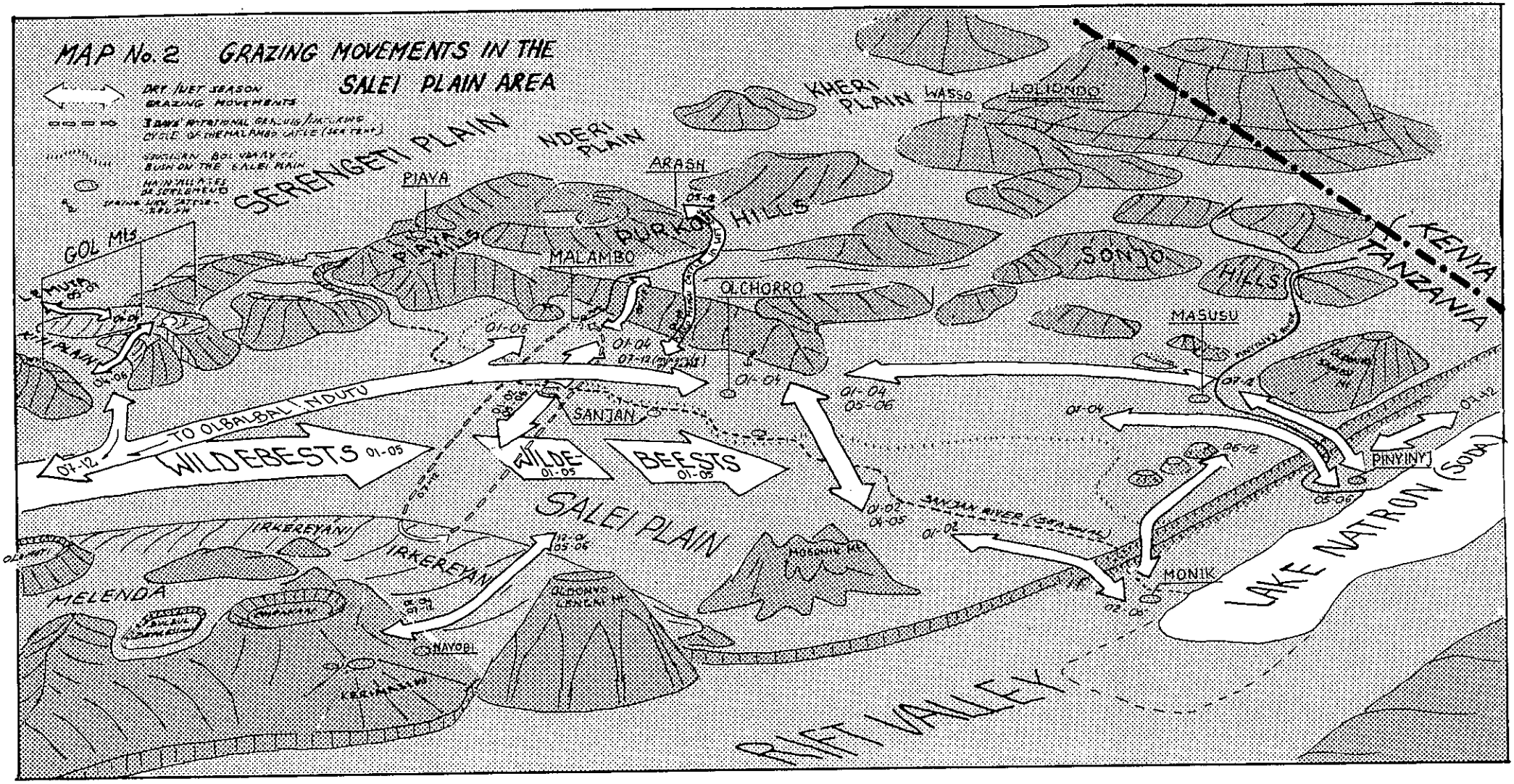
The case of the Salei plain (whose inhabitants form the independent Salei section) and the Ngorongoro highlands and surrounding plains (whose inhabitants are a sub-section of the Kisongo section) may serve as an illustration of such interdependence between secondary users. It is not an ideal case, since a substantial Kisongo minority lives in the area of the Salei section and vice versa. However, in 'Maasailand', ecological and political units often overlap extensively. There is also evidence that people from one section can acquire

secondary user rights in the area of another section. The flexibility of reciprocal arrangements often defy the narrow conceptual categories within which we want them to fit. One example of this concerns the Salei Maasai from the Malambo area and the Purko Maasai from the Purko hills (the Lamunyani massif) bordering the Salei plain from the north (see Maps 1 and 2).

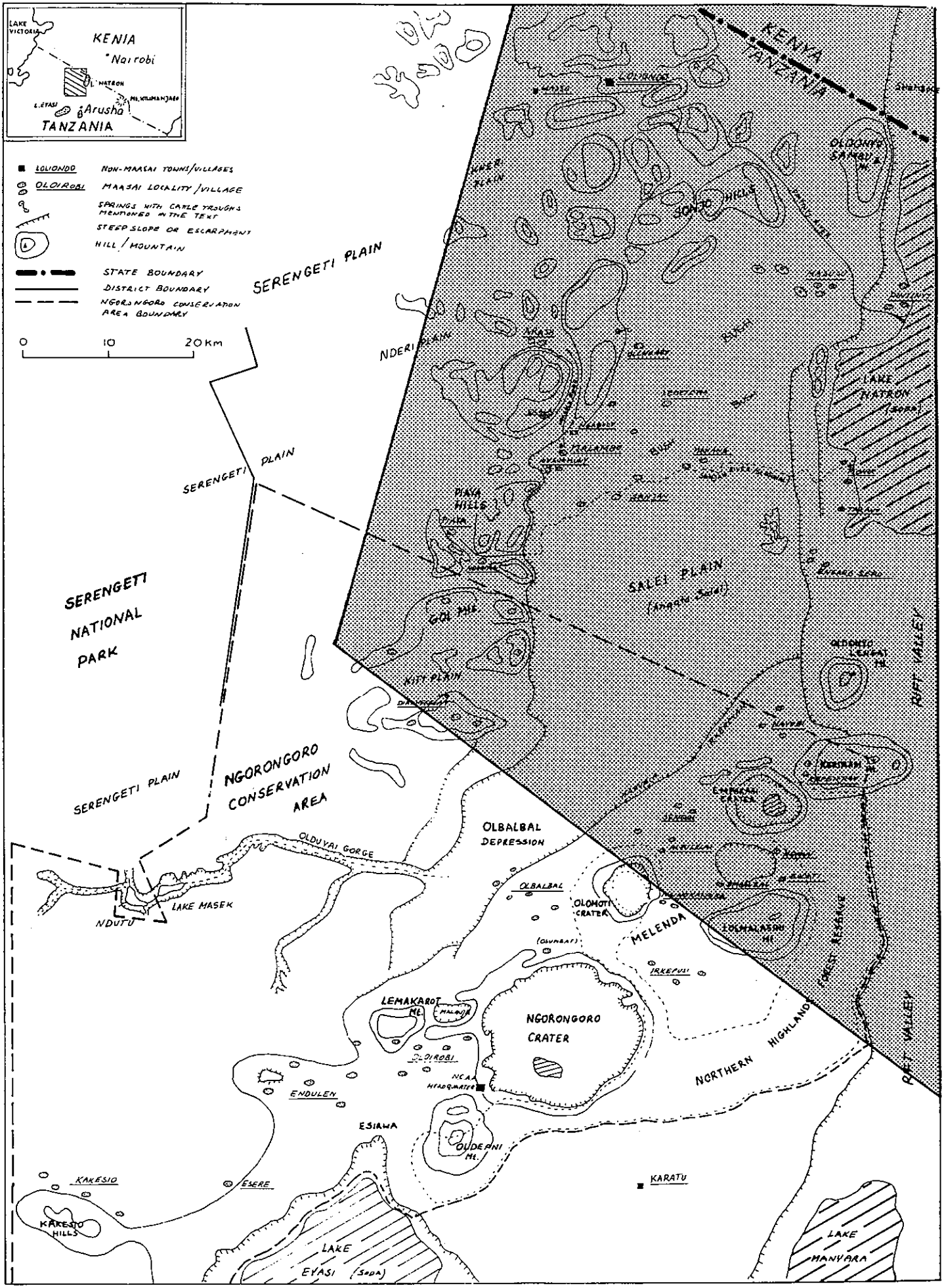
During the rainy season, the local Purko Maasai from the uplands used to move their cattle down to the plains to graze on nutritious grasses. Their customary lowland pastures are situated on the eastern outskirts of the Serengeti and Kheri/Nderi plains, which have became inaccessible during the rainy season due to the increased numbers of wildebeest. At least some of them, therefore, used to graze the northern part of the Salei plain, in the Malambo-Olchorro bush, which is free of wildebeest, and were accepted by the locals despite the growing grazing pressure in that area in the wet season. On the basis of reciprocity, some of the Salei Maasai graze cattle and smallstock in the Purko hills in the dry season, without any additional arrangements.

6. In the context of the Ngorongoro/Salei ecosystem, we should add that the local community with primary user rights retains the right to control the behaviour of visitors with secondary user rights. The 'hosts' have the right to react verbally or even physically to exclude 'visitors' from the pasture if they do not respect the local rules of grazing. This might be, for example, by improperly using reserved pastures for calves, or behaving unfairly by grazing cattle in the 'hosts'' area while saving their own resources. This does not often happen, but two cases of this kind were reported in 1992-93.

(a) The first involved a conflict between the inhabitants of Kaitakiteng and Olmekeke localities in the Endulen area. Olmekeke and Kaitakiteng are neighbouring localities on the western side of Mount Lemagarot in the Ngorongoro highlands. Olmekeke is located much lower down the mountain, and therefore, according to the Maasai, the grass loses its nutritional value in the dry season later than grass in the higher area of Kaitakiteng. Usually, towards the middle or end of the dry season, the Kaitakiteng cattle are grazed in the upper part of the Olmekeke area, to get access to better grass. They are allowed to do so since the Olmekeke people know of their neighbours' problems. However, in 1992, they sent some of their cattle down earlier than usual and the Olmekeke people chased them away, arguing that people from Kaitakiteng were cheating them by utilising their resources while saving grass for the future in their own area.


MAP No. 2 GRAZING MOVEMENTS IN THE SALEI PLAIN AREA
DRY/WET SEASON GRAZING MOVEMENTS
SERENGETI PLAIN
NDERI PLAIN
KHERI PLAIN
IWASSO
LOLIONDO
KENYA
TANZANIA
PIAVA
ARASH
PURKON HILLS
GOL MTS
MALAMBO
OLCHORRO
SONJO HILLS
MASUSU
TO OLBALBAL N'DUTU
WILDEBESTS 01-05
SANJAN
SALEI PLAIN
IRKEREYAN
MELENDA
NAYOBI
OLDONYO LENGAI MT
MOSONIK MT
MONIK
PINYINYI
LAKE NATRON (SODA)
RIFT VALLEY

AREA COVERED BY MAP 2



(b) The second case occurred in Malambo village between April and May 1993. It involved inhabitants of the Musurmuny locality (Kisongo), and the inhabitants of Soito and Ngabolo localities (Salei). The conflict, however, had no political context but resulted from the different interests of both parties.

According to the usual herding pattern, both groups, Kisongo and Salei, graze their cattle together on the Salei plain or in the bush surrounding Malambo during the wildebeest calving period in the rainy season. With the coming of the dry season, between May and August, both groups commonly use the bush area between Malambo village and the Purko hills. In August, the Kisongo Maasai usually move with cattle south to Olbalbal within the NCA while the Salei Maasai from Soito and Ngabolo usually graze their cattle further up in the Purko hills (Lamunyani) in the opposite direction.

The rainy season of 1993 was again unfavourable and reserves of grass for the dry season were small. Both Kisongo and Salei Maasai warriors (who directly decide on grazing movements) agreed that they would postpone entering the area at the foot of the Purko hills until August to conserve this grass for as long as possible. This was in the interest of Salei Maasai because they stay in this area throughout the year, but against the interests of Kisongo who would not use local resources during most of the dry season anyway. Nevertheless, the Kisongo accepted the decision since it was thought reasonable in a dry year. Nevertheless, shortly afterwards in April, the Kisongo moved their cattle into the restricted area and were chased off by the Salei. Armed conflict followed and three of the Kisongo were wounded. Elders managed to cool them down but tension remained in the area. Two weeks later Kisongo cattle were again moved into the disputed area. Village elders from both sides managed at the last moment to prevent armed confrontation. They again gathered all the warriors at a meeting and warned them that individuals violating the agreement or using weapons against each other would be cursed. This finally settled the conflict.

We can see from these cases that direct controlling mechanisms, at a level higher than that of the local communities, were clearly in operation, ensuring resources were used wisely and peacefully over this vast area. However, controlling and coordinating mechanisms, even more efficient than those described above, are also present at the level of each local community.

7. As we have seen, the Maasai system of land tenure provides relatively easy access by non-residents to resources controlled by a given locality. However, each of these localities also has a defined and limited area of pasture, where access is strictly controlled and reserved for the use of livestock belonging to the members of that community. There are also strict rules pertaining to the types of animal which are allowed to graze in these areas. The Salei and Ngorongoro-Kisongo Maasai call it *olokeri*, the southern Kisongo Maasai prefer the term *ololili*. The Loita and Purko Maasai call it *olopololi*. As the Salei and Ngorongoro-Kisongo Maasai predominate in the study area, the term *olokeri* will be used.

Olokeri is a defined area of bush or savanna, usually with diverse vegetation and valued for its resources, such as long-standing grass, brushwood species good for browsing, or trees which shed pods in the dry season. At the end of the dry season, it is usually the place with the best grass, as other pastures are already exhausted. *Olokeri* needs to be easily accessible, and is reserved for the exclusive use of animals which cannot walk to distant pastures, such as calves, sick animals, old cattle or even sometimes those being fattened for sale. Smallstock and donkeys are also grazed there. *Olokeri* is also located near to settlements for security reasons, as these sorts of animals are especially vulnerable to predators, and are usually guarded by young boys.

Olokeri is the collective property of all members of the locality or sub-locality. Since it has to be easily accessible, in the larger and more widely dispersed localities, each group of households (sub-locality) may have its own exclusive reserved pasture. In this case, the abundance of reserved pastures within the village area creates problems for the movements of mature cattle (see Oloirobi case below).

8. Precise rules for the use of *olokeri* are laid down by the local community, usually at meeting of elders (*enkigwana*). They have the right to make and change the rules of use, by consensus. They can judge somebody's behaviour, condemn and discipline them, impose a fine and even ban them from using the *olokeri*.

> (a) Manang is a small locality lying along the Sanjan river on the Salei plain. The river dries up shortly after the end of the rains, but water is accessible from the small well dug in the dry riverbed. The amount of water is limited, but enables cattle to stay there till the middle of the dry season, before moving on to the Olbalbal area (for details see Section III). After that, the amount of water available decreases drastically and

grass becomes exhausted, while the *olokeri* still has some vegetation cover.

In June 1992, at the beginning of the dry season, two herd-owners were discovered 'hiding' mature cattle among the calves in the *olokeri*. Their explanation that the animals were sick was rejected, and the *enkigwana* warned them that they would be fined one steer each, if the offence was repeated. The wet season of 1993 was very short and reserves of grass for the dry season were very low. In May, people of this locality decided that calves over two years were no longer permitted to use the *olokeri*, and would have to join adult cows on other distant pastures. This was aimed at lowering the grazing pressure on the *olokeri* in order for it to last for the weakest animals throughout the dry season.

(b) Oloirobi is a vast highland locality in the NCA composed of several sub-localities. Each of them has its own *olokeri*. The remaining area of grass is open for all adult cattle without restriction.

In 1991, three households moved their homesteads (*inkangite*) to a new place within the village, close to the Kajapuse sub-locality. Elders of the village called a meeting to discuss the move. The idea of moving to the place was not opposed, but people were afraid that creating a new *olokeri* would disorganise herding movements within the village area. These three families promised not to do that. A year later, however, they announced the establishment of their *olokeri*. This unilateral decision was opposed, since the *olokeri* cut off access to some village pastures. In addition, it constrained movements to and from water and salt licks found in the Ngorongoro Crater. The *enkigwana* of the village reminded the culprits a year ago that they had been warned against building their homesteads there, and at that time had been ordered to move from the place. They were told that they would be cursed if they did not move. They moved a few weeks later.

Although *olokeri* is in principle only for calves and sick animals, in practice a meeting of elders can decide to open it up for all categories of animals. This usually takes place at the end of the dry season, when there is no more grass elsewhere, or when they know that the *olokeri* grass will soon 'dry up' or be spoiled. This happens in the Nainokanoka area in the eastern part of the Ngorongoro Highlands, which is locally called Melenda.

9. *Olokeri* is usually one of the most productive places in the vicinity of each village. As such, strips of land within the *olokeri* can even be privatised or individualised for cultivation. This is also decided at a meeting of elders from the locality (although anyone can attend). Such approvals are usually granted, providing that the proposed activity does not endanger the user rights of others.

Such land allocation has become a problem in NCA after the lifting of the ban on cultivation. In the locality of Losilale, the whole *olokeri* was turned to cultivation in early 1993. However, this is an exceptional case involving the IlArusa Maasai (WaArusha) and local traders, for whom this kind of economic activity is very important. In other localities where the people are devoted to their pastoral occupation and agriculture only plays a complementary role, the situation is more balanced and easily handled by local communities.

10. Any member of a given locality can build a new homestead (*enkang*) anywhere within the area of the locality, except the *olokeri*, without consultation. However, if this new settlement restricts the user rights of others, the owner will be disciplined by the whole community as in the above Oloirobi case. No one can settle within the *olokeri* unless it is approved by others.

11. If a person wants to move from one locality to another, either permanently or seasonally, and wants to build an *enkang* of his own, he does not need to call an *enkigwana* of the whole locality. After arriving, he is supposed to inform elders from the locality and potential neighbours about his plans and ask them to show him a suitable place to build. The local people cannot prevent him from settling and joining their community, since in principle, all Maasai have the right to live anywhere they like. However, lack of access to local sources of water can practically, though indirectly, determine location. Once settled, a newcomer will be told by the elders the rules of using pastures and water.

The majority of short term visitors, following transhumant herding patterns, do not build independent homesteads, but rather join their fellow clan members, relatives and especially close kin or friends. This allows for labour sharing, and indirectly secures access to water sources used by their hosts.

12. Salt-licks within the Ngorongoro/Salei ecosystem are owned collectively. There is neither a shortage of them, nor is there any competition for access to salt-licks among the Maasai.

To show how this works from the perspective of an individual herd owner, the following model will be given of decision-making by an individual herder concerning choice of pastures in a given year.

Access to distant pastures is not an automatic privilege of all members of a given locality. There is an indirect mechanism in operation which ensures that during the average dry season (not in drought conditions), the population is more or less evenly distributed around all dry season pastures. A typical Maasai herd-owner, for example, from Malambo, can move with herds either to Masusu or to Olbalbal or even to the Ndutu/Masek area in south-western NCA. (For a detailed description of the actual grazing patterns of the Malambo inhabitants, see Section III).

Our model herd-owner knows that in the chosen place he has to find a good friend, an age-mate, a blood relative (clan member) or an in-law (such as a father-in-law) where he can stay during the coming season. This is important for security reasons and in order to limit his own labour needs as his cattle will be herded together with his host's herd. In an extreme case, the man can leave the whole herd in the care of the host and come back to Malambo. Even more important is the fact that he will automatically, though indirectly, obtain access to water for his livestock in this locality, either by joining a queue for water from the communal water-source, together with host cattle, or by being allowed to use water from his host's individual spring or well.

Informants often underlined the importance of having good friends, relatives or well known clan members among the permanent residents of a dry season area. A man choosing a dry season grazing area such as Masusu, Olbalbal, Ndutu/Masek in a given year, thus takes into account many factors:

- practical access to water by joining a permanent inhabitant in a queue for water from a communal or private source,
- potential competition for water and forage, based on the anticipated decisions of other pastoralists,
- the condition of forage in a given place over the foreseeable future,
- the incidence of disease and the likely resistance of his own cattle,
- the security situation in terms of cattle theft; by taking a higher risk one can gain easier access to water and good pastures,

- labour requirements in each potential place and the labour force at his disposal.

Similar reasoning has to be employed when choosing rainy season pastures, except here the added occurrence of wildlife-transmitted diseases has to be anticipated. This is why neighbours from the same permanent settlement (*enkang*) often choose different destinations for their herds. However, for the whole locality, there are typically two to three predominant herd movement patterns.

Rules of ownership and access to water sources

This section deals with the property concepts and practices concerning sources of water for livestock. Access to water for domestic use is freely granted to all on request. The need for ownership of water sources only makes sense in the dry season, when there is a relative shortage throughout 'Maasailand'.

All water sources in 'Maasailand' are either collectively owned, or are individual property. Neither the collective nor individual categories of ownership have a distinct name in the Maa language. Instead, they are given locality names, and their status is known to all. When analysing the features of both types of ownership and the practices concerning their use, this division appears to depend on the technical characteristics of the source, mainly its output. This has been confirmed by informants, who point to the dichotomy between the small sources of 'standing water', and the large sources of 'flowing water', although specific terms were not given to them.

Water-sources with a relatively small output - 'standing water' - are the wells and small springs with relatively short streams of a few metres which end up at cattle-troughs. These are individually owned. The larger sources - 'flowing water' - are the longer streams and rivers, which are collectively owned.

For the Maasai, this division is ideologically grounded and comes from their model of the world. According to them, 'flowing water' has been created by God for all Maasai, and cannot be owned by an individual person. They also know from practical experience that one man is not able to exclude others from using water from a longer stream, and that there is no reason to do so. However, the boundary between 'flowing' and 'standing' water is not precise, and allocating a particular small spring to either category depends on the local

demand for water and the supply from the particular source. It is, therefore, negotiable in a longer time span, as are all property rights.

The ideological basis for individual ownership is either an individual's investment in digging a well or an historical claim (an ancestor is said to have discovered the source 'in the distant past' and a particular individual has inherited the property rights). However, it should be stressed that although different water-sources may be either collectively or individually owned, in practice they are all collectively used.

The category of 'standing water'

Sources of 'standing water' (such as a well or spring with a simple cattle-trough) are the property of those who dug them if it is a well, or first discovered them, if it is a spring. Rights to this water pass to a man's heirs, following the rule of primogeniture. Therefore, at any point in time, each such source always has only one formal owner, who is the primary user. His patrilineal relatives (adult sons, his brothers and their sons, his father's brothers and their sons) are the secondary users. They will be granted access to this water for as long as it lasts. The owner's rights of use are unrestricted, and in an extreme situation, when the volume of water is insufficient to satisfy the needs of more than his own herd, he has the right to exclude others from its use.

However, such cases are rare. Possible exceptions are found at the small wells in Sanjan, Irkarien, and Olbalbal, which were running dry at the time of the study, and which at the height of their productivity just after the rains, were sufficient for two to five cattle herds only. In practice, individually owned water sources tend to be collectively utilised and rules of access are as follows:

- Owners have unrestricted access to water and if anything remains then it is shared with the interested members of a local community or seasonal migrants, according to their relative genealogical distance: first come close blood relatives (owners' sons, brothers, brothers' sons, owner's father's brothers and their sons). If anything still remains after distribution, it is shared with members of the wider sub-clan and, finally, clan members living in the area or using it seasonally.

- Those not related by blood (in-laws and friends) can ask the owner for permission to use water, but they do not have any legal basis

for demanding it. Their requests are always negotiable. However, the strong position of in-law relationships within Maasai culture and tradition add weight to these requests, unless they exceed reasonable limits.

To summarise, in practice, access can be assured either through clan relationships, or other ties. However, there is a strong preference for the former.

Owners maintain water sources often with the help of relatives and other secondary users, providing the latter with diffused collective rights in the individually owned water source. There is consequently a strong obligation to offer access to water, at least once, to any clan member passing nearby with his herd.

If the owner has the primary right of use, then blood relatives have secondary rights, and the owner's in-laws, friends and neighbours have tertiary user rights. The latter do not differ much from secondary user rights. However, ultimately, it is the owner who has to decide who has access. He does this according to the above hierarchy of property and user rights, keeping in mind that he is also a member of a given community, and an individual involved in a network of social relationships.

In practice, sources of water of this category are often widely known in the area by the name of the clan or sub-clan of its owner, just because it is known that they use it on a daily basis. Each non-collective source of water in 'Maasailand' has only one owner, and only his first-born son will inherit the title. However, in practice, when the local communities are small and all the potential users know each other, it often happens that the 'owner' vests the right to regulate access to other close relatives, such as his brothers and their sons. At first sight, this may give the impression that they collectively own the source and have authority to grant temporary access to others. However, from a theoretical point of view, such a source of water still has only one formal owner.

Such a situation is best illustrated by the example of the Engasumet (Olkesumet) wells in Simanjiro district, central 'Tanzanian Maasailand'.[7] They are often

[7] The ownership status of the Engasumet (Olkesumet) wells was studied in July 1993, during a brief survey of other areas of Tanzanian Maasailand. The description is included because of its theoretical and explanatory value, despite the fact that the wells lie outside Ngorongoro District.

cited in the literature (c.f Fosbrooke, 1948; Ndagala, 1992), and wrongly described as 'clan-owned' instead of individually owned property. The difference is negligible in practice, but important from a theoretical perspective.

1. Olkesumet wells

Olkesumet is located on a large bush-covered plain in Simanjiro district. The very deep wells dug in the soft rock, which are commonly attributed to pre-Maasai inhabitants of the area, are the only source of permanent water all year round in a radius of more than 50 km. In this dry area, access to water in the dry season defines who are the permanent inhabitants and who are only seasonal visitors.

There are currently nine working wells in Olkesumet. Three of them are owned by three different persons from the Laytayok clan, Ormarumai sub-clan. The remaining six are owned by individuals from Tarosero, Molelian, Laisir, Laytayok-Irpojos, Laytayok-Irmohono and Laytayok-Laytayok clans. There are three other small, older wells from which water for household consumption is taken freely, plus one government-owned borehole, pumping water for household consumption only.

Since representatives of all seven clans in Maasailand live in Olkesumet, we can compare the list of clans whose members have wells and the list of most numerous clans in the area. The correlation is striking. The Laytayok-Ormarumai, through its representatives, 'own' the majority of wells (three). Clans whose members are best represented among well owners are the most numerous in this locality. Particular families without primary (ownership) rights have secondary rights through clan ties. Clans Mamasita, Mokasen and Lukumai which have no representatives among the owners are fewer in number. However, families from these clans are said to have access to water through marriage ties with the owners, or through friendship.

In order to relate the issue of water ownership more directly to the study area, two cases of individually owned small sources of water situated at the outskirts of the Salei plain will be analyzed.

2. Olchorro l'Ole Syangau Lorkiporon spring

This spring is situated in the northern part of the Salei plain in the Malambo-Olchorro area. The first part of the name means 'a spring with a short stream which ends up with a cattle-trough'; the second part gives the name of the

current owner, whose father (Syangau) first discovered it; and the last part is the sub-clan of the owner (Lorkiporon), which is part of the Ilmokasen clan.

The present owner lives in the locality closest to the spring, also called Olchorro, together with his second brother and their adult sons. They both organise the maintenance and regulate the number of people using the water. The owner's other brothers live in the locality of Pinyinyj in the Rift Valley, and they are not interested in using the water. Consequently, they are not counted among the potential users, though they would be if they lived close by.

As the output of water is not significant, the group of permanent users is restricted to inhabitants of this locality, amounting to twelve to fifteen families, who water their livestock every two days. Less than half of them belong to the same clan or are related to the owner in some way. Some are just neighbours or friends, but they are also granted access to the water.

During the dry season, water output decreases, but the owner has never forbidden any of his neighbours from using the source. Instead, he sends part of his own herd permanently to the Malambo area, where water is available from a big communal tank, and extends the rotation cycle for watering stock from two to three days.

By doing so, he does not exclude anybody from using the source, despite the fact that others only have temporary user rights. With other individually-owned sources of water exclusion certainly happens, especially in relation to small hand-dug wells, where the output of water fluctuates rapidly (for example, in Manang-Sanjan, in the Irkarien Gorge in the Gol mountains, and in Olbalbal and Kakesio in the NCA).

Inhabitants of local communities neighbouring Olchorro, (Lemetema and Oltepesi), often ask for permission to water their cattle in Olchorro. During the first part of the dry season, until water output declines, they are granted temporary access. Later this is withdrawn and people from Lemetema and Oltepesi are thus forced to move either to Masusu or to Olbalbal.

3. Olchorro Lemetuy Ilmokasen Lombirrda spring

This spring is situated in Diarngargar in the southern part of Angata Kiti (Kiti plain) in the middle of the Gol mountains. In the 1960s, the natural small spring owned by Metuy (a member of the Ilmokasen clan and Lombirrda sub-clan) was developed by the British with a tank and cattle-trough. Metuy paid for part of

this cost. After his death, the formal ownership was inherited by his eldest son (the primary user) and he uses it together with seven other brothers and several of their adult sons (the secondary user group). Because the water output is very limited at the end of the dry season, it can really only serve family members, and a few unrelated neighbours.

The present extended family of Lemetuy is very rich, since Angata Kiti is practically free of livestock disease and herds multiply quickly. In 1991-92, the water intake, tank and cattle-trough were repaired by the local Maasai with the technical assistance of the Danish Volunteer Service. This has substantially increased its output. However, the project was criticised for investing resources in the development of a 'private' water source (personal communication from Martin Loft). Such criticism, based on an alien concept of property, is not valid in this context, since both individually and collectively owned water sources are used collectively.

The Diarngargar case is worthy of further research. It would be interesting to investigate if the group of users has become widened following the reconstruction of the spring. It would also be interesting to know whether new users are blood relatives, or neighbours or friends from other clans, and what effects there are on the local community. The information generated would also provide a basis for assessing the potential value of investing development funds in the reconstruction of 'private' water sources.

The category of 'flowing water'

Larger unimproved sources of water, such as streams and rivers which flow through several local communities, or open water pools, are all regarded as the collective property of all Maasai. This is in line with the ideological notion of the 'collective' resources given by God. However, in practice, large unimproved water sources are rare in 'Maasailand'. Most often, the larger sources are improved in one way or another by those who live nearby and use them most often.

In recent decades, the usual 'improvements' have been undertaken by the local community, assisted by government or non-governmental organisations. By building an intake from a stream or spring, water is directed through a pipeline to a tank for storage, and then to a concrete cattle trough, so as to limit waste and water more cattle at a time. Water systems of this type were constructed in Malambo, Endulen-Olmekeke, Nainokanoka-Alaililai and Olbalbal, and on a smaller scale in other places throughout the Ngorongoro and Salei area.

In the above cases, most of the resources and funds have come from government or a donor agency, but the local community has always provided labour and maintenance over the years. In this way, they have strengthened their user rights against other possible users, such as those who only use resources seasonally. By improving the quality of water resources (by raising output and limiting losses), the local community acquires primary user rights, which means that when water becomes scarce they, at least potentially, are able to limit access of Maasai from other localities. In other recorded cases, the primary users have been able to establish rules concerning the order of use and to define the necessary annual labour input for maintenance. As a result, the source of water becomes more like private (group) property, rather than the collective property of all Maasai, although at a general conceptual level, it still remains within the latter category.

As shown below, the dichotomy between primary and secondary user rights is revealed in the example of the Olbalbal and Olmekeke pipelines within NCA, although it is less applicable in the case of the Malambo pipeline.

1. The Olbalbal pipeline

In the Olbalbal case a pipe from the Endondol River serves the permanent residents of Olbalbal as primary users, while the seasonal Sanjan migrants are secondary users. This is exemplified by the fact that they are not allowed to use water in the upper cattle-trough, as it is hardly enough for the locals who use it in a two to three day rotational cycle. Instead they look for water from the small individually owned springs and streams in the same area.

2. The Olmekeke pipeline

The eight kilometre long Olmekeke pipeline brings water from the slopes of mount Lemagarot to the outskirts of the Serengeti plain. It was constructed by the British as part of the Serengeti Compensation Scheme in the 1960s, and local labour was used during its construction. The tank and the upper cattle trough are situated in the Olmekeke locality, whose inhabitants are the primary users because they maintained it over the years. People from other Endulen localities are the secondary users, since they contributed less labour and only use it during the dry season. The Sanjan people, who migrate in the dry season to NCA and use the lower tank at the level of the plain, are in the same situation.

Until recently, the distinction between primary and secondary users was not very marked, especially since there has been no shortage of water in the Endulen area, and there is no competition for piped water. However, this state of affairs has changed since the maintenance of the Olmekeke pipeline in 1991-92. The Olmekeke people as primary users took on the major burden of providing labour (nearly 300 tonnes of chipped stones were needed). They, however, invited people from the other Endulen localities, as well as regular Sanjan visitors, to take part in the work. All of them responded positively, mainly in order to preserve their secondary user rights. A significant part of the work has been completed, but unfortunately the project has been temporarily suspended by the donors.

3. The Malambo pipeline

The Malambo pipeline and tank were constructed by the British in the early 1960s and reconstructed by the Tanzanian Government in the 1970s. The local Maasai, from Salei and Kisongo sections, contributed labour. The tank's capacity is still sufficient for local needs, although its condition is very poor. The local community introduced a simple rotational system for its use: one day for the Salei Maasai and one day for the Kisongo Maasai. However, due to local patterns of grazing, there are no seasonal migrants to the Malambo area, so the distinction between the primary and secondary users is not relevant, especially since the amount of water is still sufficient. Grass and browse, not water, are the limiting resources of the area.

It is interesting to note that, according to Maasai property law, it is possible to privatise collective property such as water. So far, this only concerns a few cases, such as the construction of a new irrigation channel from the same water intake in Pinyinyj.[8] However, this theoretical possibility could be of fundamental importance to the survival of the Maasai in the near future.

It is possible for an individual (Maasai or non-Maasai) to get permission from the local community to build an intake with tank and cattle-trough from a collective stream or river, provided that such action does not endanger the user rights of other members of that local community. Informants confirmed that the community would only worry about endangering their current and short-term rights over water. They strongly denied the possibility of future 'collectivisation' of such a water intake, tank and cattle-trough by the local

[8] Potkanski, T. *The Sonjo-Maasai Property Relationships: From Complementarity to Competition*, Pastoral Land Tenure series, IIED (forthcoming).

community, for example, if hydrological conditions changed and the amount of water decreased such as to be available only in the private intake and cattle-trough.

Such a situation might seem to be purely theoretical and would not pose a problem, provided that the individual investor is also Maasai, who would be expected to share the water because of cultural obligations.[9] However, the problem becomes problematic if investment comes from an external commercial enterprise with no understanding of Maasai moral obligations, nor any economic interest in subscribing to them.

In 1991/92, the Serena Hotel Group, wanted approval for the building of a tourist hotel at the Ngorongoro Crater rim in the NCA. To service the hotel they wanted to use the main water source (Loloueru spring) of the Oloirobi Maasai. This has serious implications for local people as there is already a shortage of water for livestock, even without the potential hotel demand. Once the danger was realised, a compromise agreement was suggested to share the pumped water between the Maasai and the hotel. There is no evidence to doubt the good will of the current hotel managers, but it may well happen that in the middle of the dry season, the output of water will be insufficient for the needs of the hotel, let alone Maasai cattle. It is not certain whose interests will prevail in such circumstances.

According to traditional Maasai property law, as well as the likely agreement, the Maasai will not be able to alter the contract once it is made. (The nature of the contract is not known). Whatever form it takes it will have a bearing on other cases throughout 'Maasailand'. One lesson that can be learned from this case is that all parties concerned should be aware of all the possible consequences before such contracts are ratified in future.[10]

In conclusion, it should be stressed that although the Maasai distinguish between individual and collective property rights to water-sources, in practice, access to them is always collective, due to the diffused rights of kinsmen and the moral obligation to share water in the same way as livestock and food.

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[9] Unfortunately, the history of group and individual ranches in Kenya 'Maasailand' suggests no cause for optimism. However, it can be expected that for some years to come, commercial individualism will remain alien to the Tanzanian Maasai.

[10] Technical advice in 1993 showed that the hotel needs could be satisfied by pumping water from the Lerai Springs on the Crater floor.

Property rights in livestock

Alongside land and water, livestock is the other basic resource for the Maasai. Cattle play a special role in both the symbolic and physical spheres of Maasai life.

Property rights in livestock are similar to those for water sources, especially 'standing water'. Individual property rights exist hand in hand with the diffused collective rights of all fellow clan members.

Where there is only one 'owner' of a particular resource, a distinction will be made between 'inclusive' and 'exclusive' property rights (Rigby, 1985). The 'inclusive concept of property rights' means that many people may have potential rights to a resource (in this case livestock) at the same time. The inclusive nature of Maasai property rights in livestock is made effective in the following way: in normal everyday circumstances, only one person, the primary user, who is usually the 'owner', exercises these rights. Nevertheless, in extreme circumstances, such as the loss of somebody's herd due to drought, disease, cattle-raid or personal illness, the relationship between the primary user and other potential co-owners (fellow clan members) are renegotiated.

The practical outcome of these negotiations is observable on a daily basis: traditional restocking of impoverished clansmen organised by clan elders; individually organised sharing of livestock among patrilineal kin; even selling off or slaughtering an animal without informing the 'owner' if the fat or money are needed for the cure of a fellow clan member. Although people apparently help each other on a totally voluntary basis, they also feel culturally obliged to do so, as all have diffused rights in each others' animals. In this sense, livestock are also conceived of and managed as collective property within Maasai clans.

On a day-to-day basis, the ideological notion of individual ownership of livestock predominates. This is therefore referred to as such in the literature (Spencer, 1988), but the potential diffused rights are always present (Talle, 1988; Ndagala, 1990). These diffused rights are vested in all members of a clan, but are strongest within the extended family (through inheritance), then within the minor lineage (through individual livestock-sharing), followed by the sub-clan, and finally the clan. In the two latter cases, collective rights are mostly operationalised through the redistribution of livestock, called *engelata* or *ewoloto*, organised by clans.

At the symbolic level, the communal rights in clan cattle are marked by a common cattle-brand. Each brand consists of clan, sub-clan and individual marks, but there are other features shared with other clans, like the ear-mark. Members of clans belonging to the same moiety (*L'Odomongi* - Red Oxen, or *L'Orokiteng* - Black Ox) also have diffused rights in cattle of other fellow clans, although these are not as strong as within the clan. However, it seems that nowadays these cultural obligations to share cattle within the moiety hardly exist in practice. Nevertheless, the fact that the concept has survived at all confirms the relevance of the theoretical approach of treating cattle as collective property among the Maasai.

Non-market cattle transactions: typology from the point of view of relationships between partners

Partners of exchange in transaction relationships are either members of the same family, extended family, sub-clan or clan, and thus 'collective owners' of the cattle exchanged (gifts and loans are more obligatory than voluntary), or else they are in-laws, age-mates, friends and neighbours for whom the transactions are more voluntary and contractual.

However, the position of in-laws is quite special. The relationship between a man and his father-in-law in Maasai society is especially close (see below) and continues throughout life. Gifts given to such relatives are equally obligatory as those to close blood kin.

At a different level of social organisation, cattle transactions, involving exchanges, gifts and loans, simultaneously play different roles. They can be divided into those establishing, maintaining or reinforcing social relations, and those which represent either risk minimizing or gain maximizing herding strategies. The existence of both sorts of transactions contributes to increased 'livelihood security' in pastoral society.

Pre-inheritance and the developmental cycle of the family herd

Members of the extended family have rights in the cattle of the family herd (*inkishu olmarei*), and these rights come close to individual exclusive rights. However, the family head retains the right to dispose of an animal already allocated to his sons. The nature of property rights within the extended family are related to the developmental cycle of the domestic group.

After contributing bridewealth (*inkishu enkaputee*) to the father of his new wife (see below) a man brings her to his house. He is expected to provide her with a nucleus herd (ideally eight heifers and one steer), the progeny of which she will distribute among their future sons. These animals provide the minimum subsistence herd for the new sub-household (*engaji*), and are supposed to guarantee subsistence and the necessary commercial offtake (the steer is given for this purpose) to cater for household needs.

At the birth of each child, the man has to allocate one animal from his residual herd. If he marries other wives, he has to give each of them equivalent nucleus herds, and their children will also have to be given animals on specific occasions.

We can thus distinguish two groups of animals in the family herd. The residual herd of the head of the family (*inkishu eboo orpayan*) is the one from which bridewealth cattle are provided, as well as gifts to wives, children and other people. The herds allotted to each wife (*inkishu engaji*) are those on which the sons can count for building up nucleus herds, and from which they will obtain the bridewealth for their own wives in the future.

Within the wife's herd, there are cattle already allocated to sons by their father, cattle given to daughters which will remain in the family herd after their marriage (or will be given to sons-in-law), and cattle given by the husband to his wives but which have not yet been allocated to any sons. In general, the control by the head of the family over the family herd is almost total, and he is free to sell them for cash or buy grain, or give them to friends as gifts or loans.

In the dry season, sales of cattle are necessary and always create problems in terms of whose animal has to be sold. This never takes place without discussion and sometimes even results in quarrels. Although the negotiations can be drawn out and the wives and sons can oppose the choice, ultimately the decision of the head of the family is final. Wives have little option but to agree with the decision, but if sons are constantly deprived of 'their' animals, they can separate themselves from their father and leave the homestead. It is usual for married sons, however, to stay together in the father's *enkang* until his death, after which they can disperse. It is only at this stage that sons become effective owners of their animals. It is not so much that they choose to stay in their father's homestead while he is alive, but rather that the father tries to keep them together in order to control and manage the family herd.

In this context one source of authority is the threat of a curse which old men have at their disposal. A son who separates from his father without being given his 'blessing' can expect to face misfortune for the rest of his life. In Maasai culture, curses can be used by either male elders or by women, but never by young men who have to find other ways to assert their rights and pursue their interests.

Nevertheless, when sons grow up and marry, they can officially separate one by one from their father's *enkang*, taking their mothers but leaving a few animals with their fathers to compensate for 'not feeding him any more'. The first-born son usually stays with his father longest or, if he has separated earlier, the father moves to his *enkang*. Up until the end of his life, the father, as head of the extended family, has formal control over the animals in the possession of all of his sons. He can dispose of any of them, even those his sons have bought at the market. However, in practice such a decision would be the outcome of long negotiations, during which time the rights of both sides would be fully argued.

Inheritance of livestock

According to Maasai rules of inheritance, the first-born son is the principal heir to his father's residual herd (*inkishu eboo orpayan*). The remaining sons become the legal owners of the animals already allocated to them by their father during his life. In recent years, with the substantial decrease in Maasai herds, it has often happened that a father has distributed all his residual herd among his sons during his lifetime. This has usually been because they have needed the animals, and the father is sometimes left with too few for himself. This leads to further problems for the family since it means that when the father is approached by a friend for a gift or loan, he has to use one of his son's animals to satisfy such an obligation. This compounds quarrels which arise when animals must be sold to buy grain.

Lineage and clan rights in cattle

The diffused rights of clan members to cattle are illustrated in the following three ways:

1. If a man dies without sons and brothers, then members of his wider lineage inherit his livestock. However, this is a rather theoretical case, since an average family is usually large enough to have at least some young boys who will formally inherit the livestock;

2. In the case of misfortune or accident, an animal belonging to a fellow clan member can be slaughtered for its fat to help cure a sick person, or sold for cash to pay for hospital expenses without informing the owner beforehand;

3. When livestock are redistributed to destitute families or those with a specific problem by fellow clan members living in the same local community (*engelata* or *ewoloto*).

Marriage/bridewealth transactions and in-law relationships

Since the traditional Maasai family is polygamous (in which a man may marry several wives), there is demand for young girls of marriageable age. Bridewealth (*inkishu enkaputee*) of one to four heifers seems to be quite low when compared to neighbouring agro-pastoral groups (c.f. Turton 1980), such as the Sonjo, where it can be as much as forty head of cattle. However, such a direct comparison may be misleading as there is a continuous flow of livestock, food, clothing and money from a Maasai husband to the family of his wife that goes on throughout the marriage, and may together add up to the level of Sonjo marriage payments.

The custom of delayed marriage payments is a conscious risk-minimizing strategy employed by pastoral groups who subsist primarily on pastoral products. Since formal Maasai bridewealth payment is relatively low, there is usually no need to ask for assistance from relatives or fellow clan members. However, in recent years, a new phenomenon has made it possible and even necessary for an increasing number of impoverished fathers to 'sell off' their daughters as wives without the customary schedule of payments. In such cases bridewealth is higher with some ten cattle being paid at one time, but the father loses his claim for further help, gifts or services from the man who 'buys' his daughter. In these cases, it is quite common for people to seek assistance from relatives and fellow clan members in order to gather together the necessary bridewealth payment.

The relationship between a man and his in-laws is very close and mutual assistance is expected in times of need. However, on average, more goods and services flow from the son-in-law to the father-in-law than *vice versa*, although there are exceptions to this. Each party helps the other as a conscious strategy to build up a social network covering all of 'Maasailand' for possible future times of need.

Stock friendships and contributions to religious ceremonies

Friendships among the Maasai are established and revitalised by gifts of livestock. Friendship is usually established between age-mates, but sons commonly inherit at least some of their fathers' stock friends. Although in the short term we can speak about friendship gifts, each gift contains the expectation of reciprocity in the longer term.

Stock friendship among male kin is theoretically stronger than between other relatives and friends, since it is based on their collective rights in clan livestock. However, in practice, this kind of relationship is primarily contractual. As people have become increasingly poor, gifts of smallstock have largely replaced gifts of cattle. Stock friends call each other by the name of the type of animal given to one other: for example, *mong'i* (steer), *paing'oni* (bull), *ndawuo* (heifer), *pakiteng'* (mature cow), *pakine* (mature goat), *paker* (mature sheep), and *meregesh* (ram).

Contributions to religious ceremonies are obligatory and are either consumed during the ceremony or else offered to the ritual expert (*oloiboni*). These contributions are organised through age-groups.

Typology of non-market cattle transactions

Direct exchange: balanced reciprocity

Direct exchange usually plays an economic role in pastoral societies. The commercial market value of each type of animal is usually different from the traditional exchange value. The commercial value tends to be calculated in terms of liveweight for an animal, while the traditional exchange value is based on its reproductive potential. Before going to market, people first exchange amongst themselves in order to acquire what they need, in terms of either maximum reproductive or commercial value. Both parties to a transaction have different goals in relation to the exchange, since they have different needs.

Direct exchanges may take place between anyone whether a relative or not. Such exchanges are an important part of herd management strategies employed by each herd owner.

Indirect exchange: delayed reciprocity

Indirect exchange has delayed reciprocity. Analytically, all gifts and loans fall under this category, since reciprocity is expected in both cases. But in the case of loans, this is explicitly expressed by the giver. As this kind of exchange is based on mutual trust, it takes place between friends, relatives and people who have known each other for some time. Indirect exchanges have both economic and social significance. In the past, gifts were more common, while nowadays loans predominate as a way of assisting poor relatives or friends. The Maasai complain about this development saying that 'people do not love each other as they did in the past'.

Redistribution: generalised reciprocity

This type of non-market cattle transaction (or allocation) is governed by the rule of generalised reciprocity, despite its ideological underpinnings in terms of sharing 'collective' cattle. An individual agrees to support destitute fellow clan members so that he too might be supported in times of need (*engelata* or *ewoloto*). This exchange reflects the conceptual basis for the existence of mutual assistance networks in pastoral society.

Facing unpredictable environmental conditions and the constant risk of personal misfortune, pastoralists recognise that participation in kin-based mutual assistance networks is the best survival strategy they have at their disposal. The obligation to assist an impoverished fellow clan member is also deeply rooted in their culture through customary rules of social relations, as well as resulting from the character of property rights in livestock.[11]

Conclusions: Why call it a system?

Analysis of property rights is one of the ways for defining and institutionalising social relations within society, in this case through the medium of basic resources and their socially and culturally accepted use. To a great extent, patterns of property rights relate to the cultural assumptions of each society.

[11] Property concepts in relation to livestock, and the ways in which they are expressed through the practice of livestock sharing is a principal topic of a broader report. This report should only be treated as an introduction. From the perspective of the theory of common property resource management, redistribution of livestock to the poorest families within the clan is the most important institution.

From the analytical point of view, property rights pertaining to land, water, and livestock are very similar, both in their form and content. In all these cases, individual and collective rights exist side by side with access to them being subject to negotiation.

We have seen that property rights to land are collective in principle, but there is an informal gradation of rights of access in favour of the local community, usually in conjunction with communal rights to water-sources. It is also possible to privatise or individualise small pieces of land within the collective, if other co-owners agree.

Property rights in water are either individual or collective, but rights of access are nearly always collective in practice, despite the fact that they are internally diversified.

Property rights in livestock are generally individual, although in certain circumstances the collective aspect is clearly seen, as in the case of clan-based redistribution.

In conclusion, from the analytical point of view, property rights in land (pastures, browse), water sources, and livestock are sub-sets of a single coherent system of property relationships in Maasai society. Each sub-set can be described and explained using the theoretical framework of common property resource management. Changes within one sub-set can be translated into, or explained by, changes within another. For the Maasai, this is their traditional, though still extant, model of the world. They also see people's rights in basic resources as sub-sets of one global system. Ole Nduyoto, the eldest *olaiguenani* of the Ngorongoro Maasai, who lives in Olbalbal, explained this simply:

> "All resources have been given by God to all the Maasai. However, some of them, such as cattle or food, are being provided individually; but, in principle, they also belong to everybody and therefore have to be shared".

This may not be the product of a scientific theory, but it still remains a coherent model of the world, operated on a daily basis.

From a practical point of view, these systems are also inter-related. Changes in one sub-system can affect another. The continuing individualisation of property rights in livestock may result in a lack of resistance to individualise

pastures or water sources, or *vice versa* (see Behnke, 1985 on Southern Sudan, and Kipury, 1991 on the Kenya Maasai).

A single conceptual system of property rights defines the relationship between people as well as between people and resources. But new patterns of action also affect the Maasai value system. The driving force behind the individualisation of property rights is currently provided by the influence of the global market economy, with which the Maasai economy is already well integrated.

In the following section, we will see how Maasai customary land tenure works on a daily basis through constant competition for resources. The dynamics of the system can best be observed in situations of conflict. In other cases, the abundance of resources disguises competition, and ecological rationality appears to be the dominant logic behind herding movements. In such cases, the customary land tenure system still mostly regulates the order in which these resources are used.

It should be noted, however, that the NCA and the Salei plain are, with some exceptions, inhabited only by the pastoral Maasai.[12] Therefore, competition for resources is between the pastoral Maasai themselves and is generally ordered and ecologically sound. This can be described by using the Maasai conceptual system of property rights. However, this is not the case in other areas where the Maasai co-exist with agricultural and agro-pastoral groups, such as in Simanjiro and Kiteto districts of Arusha region. Nor is it the case in relation to the Sonjo-Maasai conflict just north of the Salei plain,[13] or the development of commercial agriculture in the Loliondo area. In all these cases, not only the Maasai conceptual system, but also that of their competitors, have to be analyzed in order to describe the dynamic process of competition for land.

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[12] Among the Ngorongoro/Salei population, non-Maasai residents (excluding NCA and hotel staff) constitute a tiny minority. They are mostly IlArusa and Iraqw traders, living in village shopping centres, as well as IlArusa agro-pastoralists who are well-integrated with Maasai society. Despite the conflict with the conservation authorities, pastoral land use has so far predominated and not been undermined by agriculture.

[13] Potkanski, T., *Sonjo-Maasai Property Relationships: From Complementarity to Competition*, Pastoral Land Tenure Series, IIED (forthcoming).

III. PASTORAL ECOLOGY AND ECONOMY

This section describes the pastoral ecology of the Ngorongoro and Salei Maasai and shows how land tenure rules operate. Their natural resource management practices, including herding strategies, will be discussed. Changes to these which have taken place over the last few decades will also be identified.

Herding strategies: basic ecological constraints and external factors

The aggregate outcome of individual herding strategies has produced distinct patterns, particular to each local community. Herding strategies are always a dynamic compromise between the needs of livestock and existing constraints, both environmental and social, resulting from current land tenure arrangements.

This issue has been dealt with by several authors both in a general way (Homewood and Rodgers, 1991; Århem, 1985), and in greater depth, though not systematically, by Machange (1988). As a result, despite the abundance of research reports on the NCA, this particular issue of such basic importance for development planning has not yet been adequately described, although many local and foreign researchers, as well as the Maasai themselves, have detailed ecological knowledge.

The key local Maasai terms of *orpurkel*, *oloirishirsha*, and *osupuko* will be used to describe the three ecological zones with different climatic and forage characteristics. Reference will be made (as the Maasai do) to '*orpurkel* cattle' as those which graze in this zone, or the '*orpurkel* grasses', for those which are commonly found there.

The Maasai traditionally distinguish between the hot, lowland, short-grass pastures of *orpurkel* (Angata Salei [Salei plain], Rift Valley floor, Olbalbal depression, Angata Kiti [Kiti plain], Serengeti plain ranging up to the Ngorongoro highlands), and the cool, upland pastures with medium and high moist grass, called *osupuko*, (most of the Ngorongoro highlands pastures). In some areas, the Maasai also identify an intermediate zone, called *oloirishirsha*, which shares some features of both. *Oloirishirsha* is usually covered by pockets of bush and grasses of medium height which dry up later than on the lowlands. For the latter reason, as well as due to a relatively mild micro-climate, this zone is treated as a separate entity for the sake of livestock management and human habitation.

Within the areas of research, the Gol mountains, the Purko hills north of the Salei plain, the Kakesio hills, Esirwa south of Oloirobi village close to the Eyasi escarpment, and an intermediate section of the slopes of Mount Lemagarot at Endulen, belong to the *oloirishirsha* zone. In the eastern part of the Ngorongoro highlands a section of the Olomoti slopes (between the villages of Olbalbal and Alaililai), as well as a wide section of the Empakaai slopes on the Salei plain side (between the villages of Sendui and Nayobi) belong to the same category (see Maps 2-4).

It makes sense for the Ngorongoro Maasai to distinguish the *oloirishirsha* zone in areas where there are marked differences in altitude between available pastures, and consequently considerable variations in grazing conditions. However, for the Salei Maasai, who rarely climb slopes with cattle, the division between *orpurkel* and *osupuko* usually suffices. For reasons of simplicity, they describe the neighbouring Purko hills or Gol mountains as *osupuko*, instead of *oloirishirsha*. Nevertheless, the notion of an intermediate zone is known to them, and when pressed, they confirm the usefulness of the term. However, this zone is called *olaiparak* instead of *oloirishirsha* and is described by them as a "nice place to live for people and cattle; not too hot, not too cold ...".

All three zones have different dominant species of grass, and consequently a varying incidence of tick-borne disease. High and moist highland grasses (*Eleusine jaegeri, Pennisetum sphacelatum, Themeda triandra* and others) provide a better micro-climate for ticks than short, dry lowland grasses. Due to the existence of a rich catchment zone in the highland forest, water is more easily available there than in the lowlands. The dominant species of grasses in the lowland pastures are *Aristida keniensis, Sporobulus ioclados, Digitaria abyssinica and Cyndon dactylon*. The *oloirishirsha* intermediate zone shares more common features with highland vegetation and micro-climate than with the lowland zone

A basic rule for herders is that cattle which are used to living permanently in the hot, lowland pastures should not be moved up to the cool, upland pastures. The Maasai claim that climatic stress reduces natural resistance of the *orpurkel* cattle to diseases endemic to the highland area, which can lead to heavy losses. As a result, such movement is only made as a last resort in years of prolonged drought. In practice, *orpurkel* cattle can only safely reach the lower part of the *oloirishirsha* zone, as it would otherwise be too risky to climb higher, due to increased tick infestation.

On the other hand, Maasai claim that cattle usually raised in the highlands (*osupuko*) can be seasonally grazed on lowland pastures (*orpurkel*), as climatic stress is less in this direction, and the incidence of tick-borne diseases is much lower. However, they add that they should not stay in the *orpurkel* zone longer than four to six months, as cattle would otherwise lose their ability to withstand the cold and would suffer after returning to the highlands.

The natural resistance of the upland cattle comes from the fact that they are permanently exposed to ticks and this has given them a degree of resistance. Too long an absence from this environment leaves them vulnerable on returning to upland pastures, particularly as chemical prevention through dipping is rare because of the lack of acaricide chemicals in the whole area.

Despite natural resistance, the mortality rate in the highlands is extremely high. This is because there has been an increased disease burden over the last few years (Field, *et. al*, 1988; Machange, 1988), that was combined with long dry seasons in the highlands, which additionally made livestock weak and susceptible. In this situation even a relatively short period of grazing in the *orpurkel* radically improves the nutritional and health conditions of highland cattle.

Apart from the disease burden, other differences in the availability of grass and water distinguish *orpurkel* and *osupuko*. The precise nutritional value of different grass species will not be discussed here. This is summarised in Homewood & Rodgers (1991) and further detailed research is underway. It suffices to say that all the short and medium-high upland grasses are highly nutritious and rich in minerals during the rainy season - the most dynamic period of their seasonal growth cycle. Both *osupuko* and *orpurkel* grasses lose nutritional value after the rainy season. The drying process in *orpurkel* is rapid and grasses there preserve more nutritional value than in *osupuko*, where moisture from fog and precipitation is present throughout the dry season and growth continues beyond the point of maximum productivity. In general, the higher up the mountains one goes in the dry season, the more the mineral content of grass decreases, as does its grazing value (Machange, 1988).

Nevertheless, in reality, the nutritional value of a particular species of grass depends more on its particular characteristics than on altitude. Some of the highland grasses preserve a high nutritional value until the end of the dry season (e.g. *olopi kidong'oi*), while the quality of others decrease rapidly (e.g. *orkujita onyokie*). Unfortunately, most of the valuable highland grass is already totally

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consumed by the end of the dry season (or inaccessible due to lack of water), and only less valuable species are available at that time.[14]

From September, highland grasses start to lose their grazing value. Since the highland grasses stay green throughout the dry season, and pasture is sometimes abundant (excluding the disputed case of unpalatable *Elusine jaegeri*), an outsider can be deceived into thinking they are still highly productive. However, cattle, and especially calves, are thin and die in great numbers at this time, as happened in Oloirobi and Melenda in December 1991. Maasai say this is because of 'drought', although in the nearby lowlands, 'drought' means bare soil with almost no grass at all (for example, the lower part of Olbalbal in the dry season). This is why the Maasai from the highlands (e.g. from Oloirobi and Melenda) are forced to move their cattle to the nearby forests (*ndimi*) where cattle can obtain browse from trees and bushes.

It might seem reasonable for *osupuko* Maasai to move their cattle to the *orpurkel* at the end of dry season to graze the lowland grasses which still provide valuable grazing, providing there is sufficient water. *Orpurkel* cattle that are grazed there throughout the year are said to be the most healthy. However, the Maasai from *osupuko* stress the importance of yet another factor. They say that *osupuko* cattle are used to highland species of grass in the dry season and any rapid change of diet "...would make their condition worse". Additionally, a prolonged period in *orpurkel* (exceeding a few months in the wet season) reduces their natural resistance to tick-borne diseases. This pertains more to the *osupuko* than *oloirishirsha* cattle, which can move freely and remain in the lowlands for longer periods, since the change of micro-climate and diet is not as great. Consequently, it is also less risky for *orpurkel* cattle to graze in *oloirishirsha* than *osupuko*.

Short plains grass is a more valued grazing resource for the reasons described for both upland and lowland cattle, but it dries up shortly after the end of the rains in May/June. Although it is heavily grazed by wild ungulates during the wet season, much still remains after their departure. Even in its dried form, it is a nutritious dry season grazing resource, especially for the *orpurkel* cattle which are familiar with these conditions, but its value is limited by the lack of water. The Salei plain, for example, has only a few small springs or streams

[14] Another possible explanation is that the nutritional value of some highland grass species does not decrease, but cattle may simply need a periodical change of diet and therefore need to be grazed on the lowland grass (Lis Ellemann, personal communication, February 1994).

scattered around the slopes of the Gol mountains and the Ngorongoro massif. Lack of water results in the underutilisation of a vast area of dry season pasture on the Salei plain, Angata Kiti, Lemuta and Olduvai areas.

Traditional grazing patterns

For the reasons described above, the traditional grazing strategy of the highland Maasai is to try and maximize the use of lowland grasses at the time of greatest productivity, retreating to upland pastures in the dry season when the availability of water and grass is in decline. Until the late 1960s, Maasai from the Ngorongoro highlands grazed their cattle in the lowlands throughout the rainy season (Angata Salei plain or on the part of the Serengeti plain which belongs to NCA), and spent most of the dry season in the highlands. Such grazing in the lowlands (*orpurkel*) allowed cattle to get enough strength to sustain themselves in the highlands, despite the poor grazing value of the grass. Local Maasai claim that the tick-borne disease burden in the past was not as heavy as it is today (Field, *et. al.*, 1988).

Maasai from the Salei plain, on the other hand, made extended horizontal transhumant movements on the plains in search of grass and water. Until the mid-1970s, they grazed their cattle on the Salei plain during the rainy season, and when the surface water dried up, moved north to parts covered by bush close to Malambo, Olchorro and Masusu, where there are perennial springs and streams.

Impact of wildlife transmitted diseases on grazing patterns

Traditional rainy season pastures were always shared with a large number of wild ungulates migrating from the northern part of Serengeti. Wildebeest calved down on these pastures, but their numbers did not create problems, and the effects of wildlife transmitted diseases such as malignant catarrhal fever (MCF) were negligible. Until the beginning of the 1960s, the number of wildebeest in the Serengeti-Ngorongoro ecological zone was stable at around 0.2 million, but since then it has grown rapidly. In the mid-1970s it reached its peak of 1.4 million, with 0.7 million Thompson's gazelles. Since that time, the wild ungulate population has decreased slightly to around one million wildebeest and 0.2 million Thompson's gazelles (Malpas & Perkin, 1986; Homewood & Rodgers, 1991, citing Cobb, 1989).

The Maasai from Malambo call the year 1976 '*Alari loo'engati*' (the year of wildebeest), in recognition of the first time in their history when they were totally excluded by wildebeest from rainy season grazing on the Salei plain. Despite the slight fall in the total number of wild ungulates within the Serengeti-Ngorongoro ecosystem in recent years, nothing has changed for the Maasai. The number of wild ungulates is still much higher than the maximum limit which makes mixing of wildebeest and cattle safe (i.e. when the average level of losses is comparable to the advantage gained from grazing the valuable lowland pastures throughout the rainy season).

Changes in grazing patterns

As a result of increased wildebeest numbers, the traditional Ngorongoro Maasai seasonal migratory pattern (*osupuko* <-> *orpurkel*), and horizontal migrations across the Salei plain in search of water for the Salei Maasai, has become permanently distorted. The Serengeti and Salei plains are not accessible during most of the rainy season. Salei cattle have to retreat to the Malambo-Olchorro bush during that time, an area which is also extensively used in the dry season. Ngorongoro cattle are kept off the plains on the overcrowded slopes of the eastern highlands in the *oloirishirsha* zone, or higher up in the *osupuko* zone where they will also be kept throughout the dry season. So far, no recent research confirms, nor has the NCAA reported environmental degradation within NCA or on the Salei plain. This suggests that diverting the traditional Maasai range management patterns has not yet brought about observable negative effects. This testifies to the fact that the Ngorongoro grassland ecosystem is both sufficiently resilient and productive such that neither Maasai herds, nor the increasing wild ungulate population can easily destabilise it.

This may happen, however, if an increasing trend in numbers continues. Perhaps not directly and not in all places, but there are risks in such places as the Malambo bush area[15] that is already heavily utilised. In the rainy season, large herds of livestock are kept for longer periods than would otherwise be the case by the presence of migrating wildebeest, and some of them stay there during the dry season as well.

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[15] A comparison along the present border between areas of open savanna and bushland in the northern and north-eastern part of the plain in the Malambo area, using the 'Map of Serengeti National Park and the surrounding area' (Frankfurt Zoological Society 1970) and based on aerial photographs, did not reveal any significant deviations. The local Maasai also denied 'degradation' (permanent, irreversible change of the vegetation types) of the Malambo/Olchorro bushland. However, all agree that the area is heavily utilised.

Availability of water as a factor determining herding patterns

The Malambo/Olchorro bush area is not evenly utilised in the dry season. This is because there are only two permanent water sources (the communal Malambo tank and the individually owned, though collectively utilised Olchorro stream). This causes a concentration of livestock within a limited area, leaving large areas of bushland underutilised in the dry season. Two other British-made cattle troughs in the area (Lemetema and Embarbal) no longer function. If they are repaired, livestock could easily spread out and thereby ease grazing pressure on this important area. Dry season grazing pressure in the Melenda area could be alleviated by opening up the Salei plain and Melenda-Olomoti slopes for dry season grazing by building a new pipeline from the northern Olomoti slopes (in fact from the Crater or by extending the Emunge water system) that supplies cattle troughs situated on the plain and in the *oloirishirsha* zone. This would also ease grazing pressure by enabling cattle from the Gol mountains to use a lowland area other than that around Olbalbal. In mid-1993, the extension of the Emunge pipeline to *oloirishirsha* (Irkaragarien) was completed by the water department of NCAA.

Opening up new pastures through provision of water and easing grazing pressure seems to be the only available (and environmentally-sound) option for future sustainable range management. Other proposals, such as the culling of wildebeest ('wildlife harvesting'), are thought to be unacceptable on both moral and conservationist grounds. This may also be unnecessary as wild ungulate populations can dramatically decline naturally. The use of fencing by the Maasai in Kakesio-Esere, Angata Kiti and Malambo-Sanjan areas proved not to be successful. While the use of modern equipment might be more successful, it could create abnormal concentrations of wild ungulates, causing possible environmental damage. It seems more promising to draw lessons from the Serenget Maasai who currently live in the Kakesio area (see below). The success of their flexible land use system can inform us of the value of indigenous methods of range management.

Disease constraints on grazing movements: Maasai methods of managing risk

Cattle fatalities in the area are mainly due to tick-borne diseases: East Coast Fever (ECF), which the Maasai call *oltigana*, and Bovine Cerebral Theileriosis (BCT), called *olomilo*. These cause the overwhelming majority of deaths in the highlands and a growing number of deaths on the northern outskirts of the Salei plain. The other major fatal disease is the wildebeest-transmitted Malignant Catarrhal Fever (MCF), called *ingatee*. This is a viral disease spread through

the afterbirth of wildebeest, which contaminate pastures during and after the calving period in late January until April. MCF is endemic to wildebeest, however wildebeest calves only suffer a mild version of the disease, while it is fatal to domestic livestock (with around 80% mortality). The Maasai claim that MCF can also be spread over a short distance by the wind, as well as by vultures.

Smallstock are not sensitive to MCF, but the Maasai report that a similar disease, called *iingolin*, is spread by Grant's gazelles with similar results. Fortunately, Grant's gazelles are much less numerous. As both wildebeest and Grant's gazelles graze together, smallstock can not be grazed with wildlife at calving time. In the Endulen-Olmekeke locality, deaths from *iingolin* have been reported, although they represent a negligible percentage of losses.

Traditional techniques of avoiding ECF and BCT involved the seasonal removal of livestock from the most infested areas in the highlands during the rains when the tick population multiplies quickly, to the safer lowlands where the concentration of ticks is lower. In the past, highland grass was also burned at the end of each dry season, not only to control bush encroachment and encourage the growth of new grass, but also to limit the numbers of ticks. However, seasonal grazing in the lowlands remains the most effective means by which cattle gain the strength to survive exposure to ticks. However, this pattern of movement has been severely limited by the presence of wildebeest during most of the wet season. They arrive and cover the whole plain just after the beginning of the rains. Cattle can only graze safely for three to four weeks in December/January, after the beginning of the rains and before the wildebeest calving starts, and again for a month or so in early May, after calving ends until the grass and open water sources in *orpurkel* dry up.

Since cattle are very weak after the dry season, and the *oloirishirsha/osupuko* grass is less nutritious than *orpurkel* grass in the wet season, the Maasai try to keep cattle on the plains until the very last moment, despite the risk of infection. Maasai claim that losses do not arise because of ignorance, but as an outcome of a conscious but unavoidable 'game' which they are forced to play, as there is no other good grass on the slopes and in the highlands. Most herd owners have little choice but to continue playing the 'game'. A few additional days of grazing on the lowlands can substantially increase the nutritional status of the herd.

A survey of cattle losses due to MCF shows them to be high. (This is also the case in Olbalbal which has not been covered by systematic survey). However,

in five randomly selected households, the MCF toll accounted for around 75% of losses after the 1992 rainy season. By contrast, MCF-caused mortality in the locality of Kakesio-Osinoni was nil in the same period. The Serenget Maasai living there claim to be experts in avoiding MCF by removing livestock from the plains at just the right time, as they did in the Serengeti before eviction in 1959. In short, they migrated at the beginning of the rainy season, always slightly ahead of the wildebeest, on the way to the Kakesio highlands. This migration was reversed when people, cattle and wildebeest migrated back to the Serengeti in the dry season, keeping the wildebeest ahead of them. Now that migration is restricted to the Kakesio zone alone.

Table 3. MCF-caused cattle mortality in research localities during and after the 1992 rainy season

Locality	Number of Cases	% of Total Losses	% of Total Herd
Salei plain:			
Malambo-Sanjan	133	100	15.1
Malambo-Musurmuny B	96	92	10.1
NCA:			
Endulen (Olmekeke + Ndiyan)	183	61	8.0

It should be noted that the main impact of MCF on cattle mortality is not as direct as that presented in Table 3. In most localities in both Ngorongoro and Salei areas, MCF-caused losses are not predominant and are ultimately avoidable, although at the cost of withdrawing cattle from valuable pastures when they are especially weak and in need of highly nutritious fodder. The indirect impact is, however, more serious. To avoid contact with wildebeest, herd owners withdraw cattle from the plains and drive them into the tick-infested upland pastures, where ECF and BCT exact a very high toll. The latter would have been avoidable, had the Maasai been able to use their traditional open plain pastures throughout the rainy season.

Security situation

Another factor constraining grazing patterns is lack of security due to cattle raiding. In the late 1980s, Maasai in the NCA were the victims of organised Sukuma and occasional Datoga cattle raids.[16] In the 1990/91 dry season, Salei plain cattle did not graze in the Ndutu/Masek area for fear of Sukuma raids,[17] and also abandoned their second major dry season pasture in Masusu due to violent conflict with the Sonjo. All the Salei plain *orpurkel* cattle spent the dry season in Olbalbal, increasing grazing pressure to the limit, and leaving almost bare ground at the end of the dry season.[18]

However in 1991/92, local police in the Kakesio area claimed that the majority of recent cases of cattle theft were caused by Maasai, although most probably those from beyond NCA. Since 1992, the Ndutu area has been abandoned in the dry season for fear of raids, which aggravates grazing pressure on Olbalbal. Retaliatory small scale raids between the Maasai and Datoga sustain tension in the Kakesio Hills (Oldonyo Oloirujuruj), again negatively influencing both range management and the mobility of households in that area.

In 1992-1993, another phenomenon caused insecurity in the area. Raiders from war-torn Somalia have became very active in both Ngorongoro district and further south in Sukumaland. In Sukumaland, they started to steal cattle with the compliance of some of the Maasai. The issue is not new and Somalis have been implicated in poaching and cattle rustling for decades. What is new in Tanzania is the increased scale of raiding, and the degree of violence used in confrontation with district security forces.

The role of local Maasai is crucial to an understanding of raiding. From the 19th century to the present time, Somalis have played an important role in the Maasai economy. They trade beads, fabrics, and other consumer goods for cattle, smallstock and hides. In the second half of the 20th century, they have

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[16] The Datoga (sometimes Tatoga, Tatog or Barabaig) are a pastoral group of Nilote, who mainly live south of Maasailand in Hanang and Mbulu districts of Arusha region.

[17] The Sukuma are an agro-pastoral people living mainly in Shinyanga region to the south of the Serengeti/Ngorongoro area.

[18] The pastures of Olbalbal (which are, in the dry season, the most over-crowded in the whole of NCA) did not show signs of degradation after the dry seasons of 1990/91 and 1991/92. Moreover, the grass flushed more abundantly than ever at the onset of rains. From this perspective, the term 'overgrazing' does not seem to be applicable to current Salei/Ngorongoro conditions.

been partially replaced by young Maasai traders, but remain suppliers of beads in exchange for hides.

Relations between the Maasai and Somali are ambivalent. The Maasai need their trade, but at the same time are afraid of heavily armed Somali groups in their territory. However, being armed only with spears and receiving little assistance from the security forces, they have no choice but to accommodate them. Authorities at village level personally feel very insecure as they have practically no means of defence, or alternatively direct contact with the security forces. In most cases, when the authorities in Loliondo or Ngorongoro are informed about the presence of Somalis, there is very little that can be done, as there is a scarcity of manpower, transport, arms or communication. Unfortunately, in some cases policemen or rangers have behaved brutally towards Maasai suspected of accommodating Somalis. This situation has improved significantly in the second half of 1993 due to the strengthening of the security forces and much better cooperation between the Maasai within NCA and the Loliondo divisional authorities. The key to solving this problem is building mutual trust between the security forces and the local Maasai community, as well as developing practical ways of cooperating through the exchange of information, as well as strengthening the security forces themselves.

Patterns of range management: grazing units within the Ngorongoro/Salei ecosystem

In this section the usual grazing movements of the Salei plain Maasai and Ngorongoro Maasai are described according to the localities of permanent residents. This is justified as individual herders are free in their choices, and adhere to one or another locally predominant grazing pattern. As a result, we can speak of typical grazing movements for each locality.

Grazing movements are not purely the outcome of ecological rationality. They are also influenced by property rights to land and water sources. This is clear at the level of individual decision-making, and with the whole local community. People from other communities (not permanent residents) gradually acquire rights to use resources in a given place. From a short-term perspective, all these arrangements seem stable, while in fact they are fluid over a longer period of time. Although drastic reshuffles do take place when conflicting interests meet and one of the groups involved does not 'play fair'.

Localities on the Salei plain

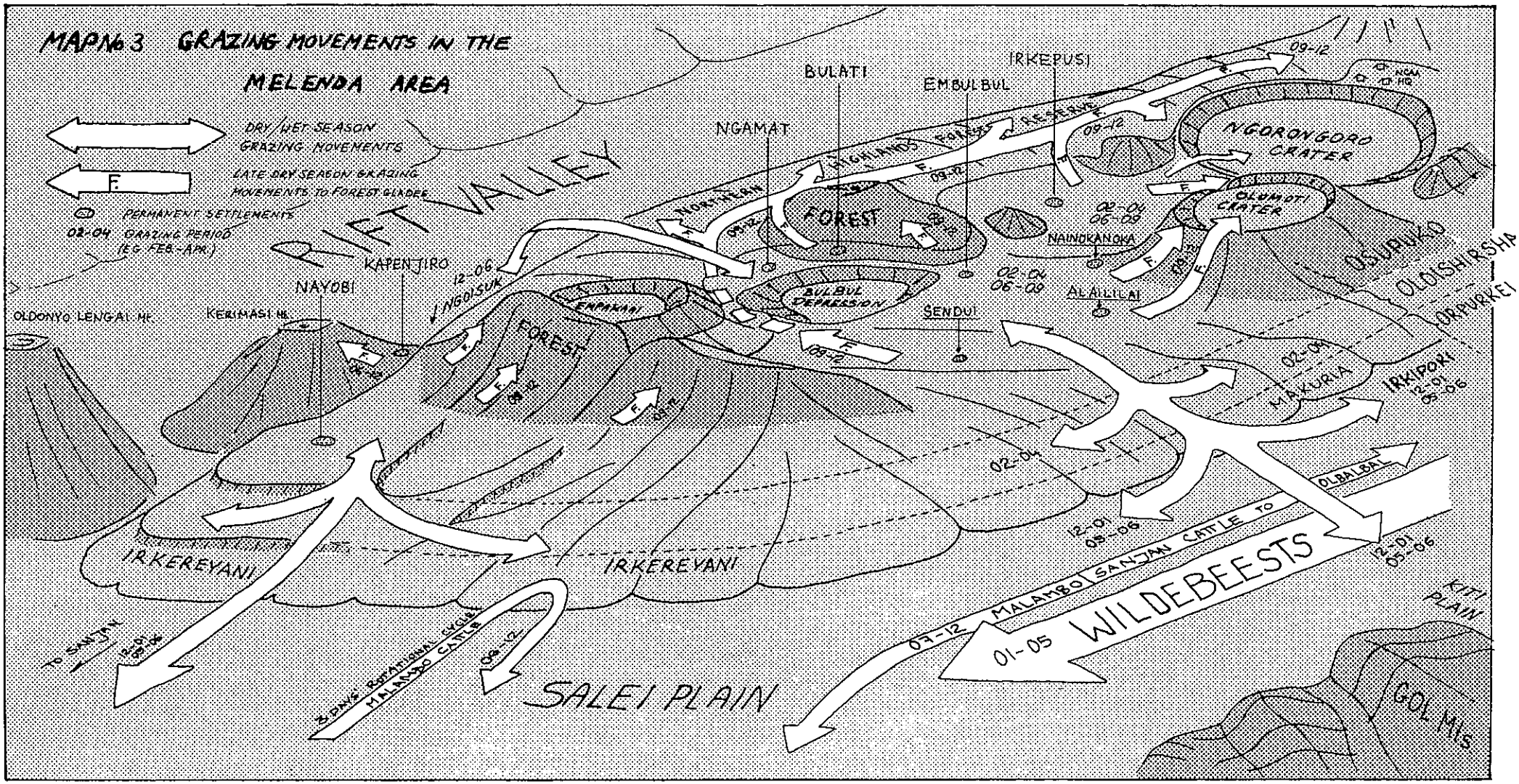
The basic transhumant patterns of land use on the Salei plain involve horizontal cyclical movements between two or three different grazing areas throughout the year. All these pastures belong to *orpurkel*, but differ in terms of the availability of water and grass, the threat of disease, and security. These will be analyzed with respect to the main localities in the area in which we can discern several ecologically viable grazing units.

1. **Malambo, Sanjan, Masusu <--> Olbalbal, Masek**

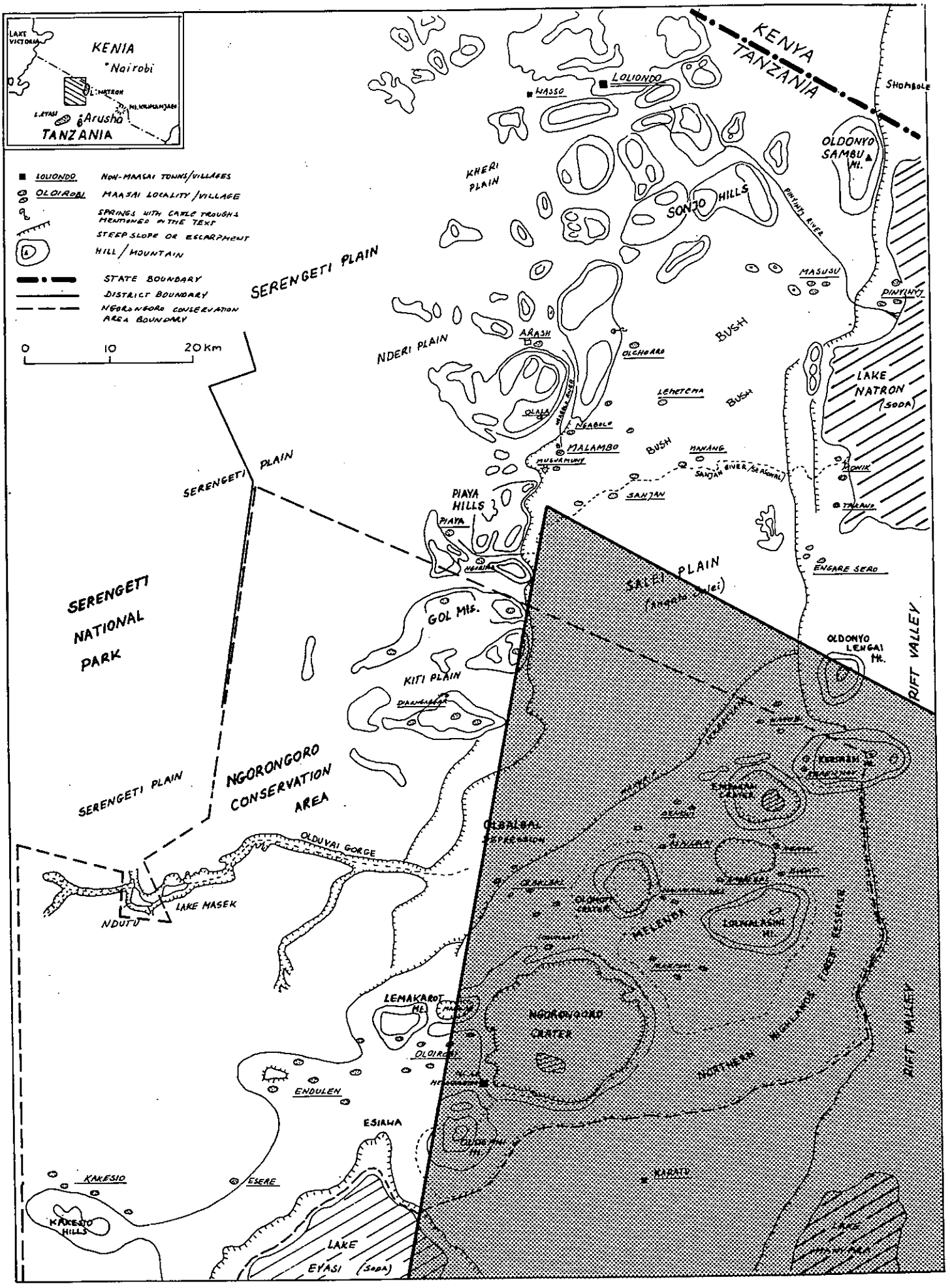
During the rainy season, residents of Salei plain localities, who include the inhabitants of Malambo, Sanjan and Masusu, keep their livestock close to permanent settlements in their home localities, usually north of the Sanjan river in dense bushland from Malambo, through Olchorro, to Masusu. Wildebeest do not enter the bush area in large numbers for fear of predators. The types of grass growing in the Olchorro bushland are said to be particularly valuable for milking cows. Cattle are moved onto the open plain for only a short period between the beginning of the wildebeest calving in January, and again when this finishes in late April or early May. They can stay there until the surface water-pools dry up. In June/July the plains' grass, already heavily grazed by wildebeest, becomes dry. However, more importantly, water is available only from the Malambo tank or from the Olchorro stream, which limits grazing movements and is insufficient for the whole local herd (Maps 3 and 4).

At this time, the Malambo/Sanjan herds are divided into three unequal parts. Around 50% are gradually moved to Masek and Olbalbal (Ndutu is still avoided) in the NCA. Most of the Maasai who choose this option are Kisongo by ethno-political affiliation, and they are used to grazing in the Kisongo-dominated Ngorongoro area.

The second group of around 30%, belonging mostly to the Salei Maasai, are moved to Masusu, which is their traditional dry season grazing area. However, Masusu has limited grazing resources, and by December they are usually depleted, and most people move via Malambo (for water) to Olbalbal. Cattle belonging to the permanent inhabitants of Masusu stay there in the dry season, and in December are moved either to the slopes of neighbouring Oldonyo Sambu, where a limited reserve of grass always remains, or to Olbalbal. During the rainy season, in order to save grass for the dry season, livestock are not grazed in Masusu, but stay in the bush between Masusu and Olchorro where they are watered from surface pools.


MAP No 3 GRAZING MOVEMENTS IN THE MELENDA AREA
DRY/WET SEASON GRAZING MOVEMENTS
LATE DRY SEASON GRAZING MOVEMENTS TO FOREST GLADES
PERMANENT SETTLEMENTS
02-04 GRAZING PERIOD (E.G. FEB-APR.)
RIFT VALLEY
NGAMAT
BULATI
EMBULBUL
IRKEPUSI
NGORONGORO CRATER
OLUMOTI CRATER
FOREST
NAINOKANOKA
ALAILILAI
SENDUI
BULBUL DEPRESSION
KAPENJIRO
NAYOBI
OLDONYO LENGAI Mt.
KERIMASI Mt.
NGOLSUK
ENPAKAI
OSURUKO
OLOLOSHIRSHA
ORPURKEI
IRKIPORI
MAKURIA
OLBALBAL
IRKEREYANI
SALEI PLAIN
WILDEBEESTS
MALAMBO SANJAN CATTLE TO
TO SANJAN
KITI PLAIN
GOL Mts

AREA COVERED BY MAP 3



A minority of the Malambo inhabitants (around 20%) keep their cattle in the area throughout the year. Most of them live in the localities of Ngabolo and Musurmuny. They graze their livestock during the dry season in the Purko hills (Lamunyani) to the north. Unfortunately, this area is infested with ECF-spreading ticks.

Each dry season, a small group of Malambo herders (mostly from Sanjan localities) move between Malambo (where cattle are watered) and the area called Irkereyani, situated below Nayobi village at the foot of the Empakaai massif in the eastern Ngorongoro highlands. The area is known for having reserves of the unpalatable grass called *orkereyan*. The upper part of this extensive pasture is utilised by Nayobi cattle, while the lower part, due to lack of water and the difficult approach from down the slope, is underutilised. Malambo cattle fill this niche. This is, however, a risky venture, as cattle have to trek nearly 30 kilometres between pasture and water within a three-day cycle. Any delay can cause high losses due to dehydration.

2. **Pinyinyj, Monik <--> Masusu**

In the rainy season, livestock belonging to the Salei Maasai from the two Rift Valley localities of Monik and Masusu also utilise pastures on the outskirts of the Salei plain. At the onset of the rains they are moved as far as possible onto the plain, and gradually withdraw giving way to wildebeest. Most of the rainy season is therefore spent in the woody savanna around Olchorro and in the bush south of Masusu.

In the dry season, cattle are grazed either in Masusu (those from Pinyinyj), or south of Masusu (those from Monik). Both groups are watered in the Pinyinyj river every 2-3 days. Some cattle are sent for dry season grazing further north along the Rift Valley, up to Lositeti on the Tanzania/Kenya border, or even further north into Kenya to the ECF-free Elangata Vuas or the Loita plain. However, in the recent past, herding movements from Kenya to the Salei plain and Ngorongoro, as reported by Homewood & Rodgers (1991), has not been recorded, except for a few cases in Soit Sambu, Loliondo division. Smallstock are grazed locally, or in the vicinity of Monik and Pinyinyj (Map 3).

Localities in the Ngorongoro Conservation Area

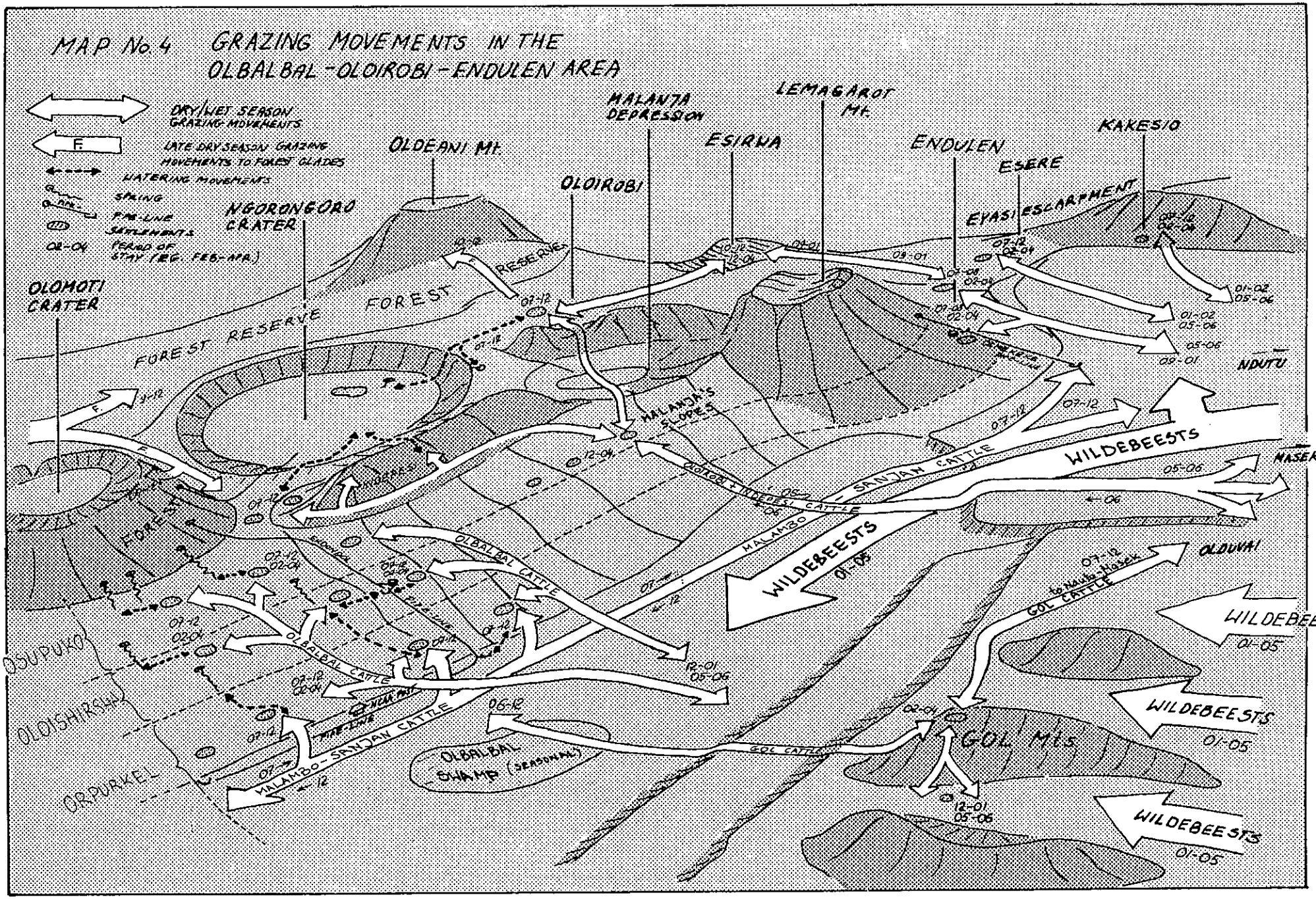
There are several grazing units within NCA that are sustainable from an ecological point of view.

1. Kakesio, Esere <--> neighbouring Serengeti plain

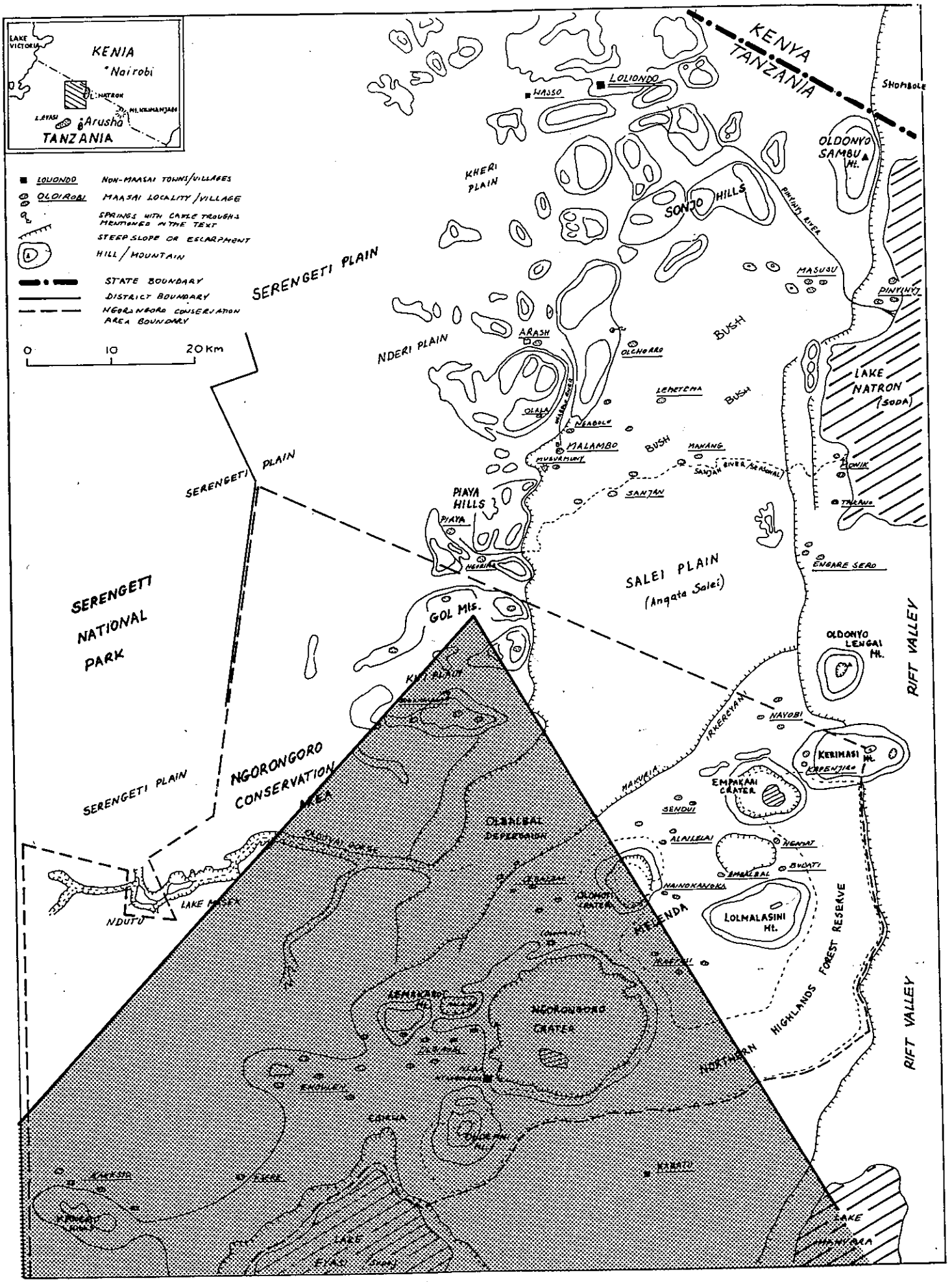
All residents of the six localities of Kakesio are Serenget Maasai, evicted from the Serengeti after the creation of the Serengeti National Park in 1959. Since then, a new pattern was established, with movement restricted to the NCA. The rainy season was spent on the southern outskirts of the Serengeti plain. The relatively small number of wildebeest did not create a risk of disease, nor did they come close to the Kakesio hills (Oldonyo Olorojuruj). Cattle were watered from surface pools as elsewhere in 'Maasailand'. The whole dry season was spent in the Kakesio hills, where grass was of high quality and water easily available from shallow wells. Starting from the late 1960s, however, the pattern altered significantly.

Currently, the whole dry season is spent on the overcrowded foothills, as moving to higher ground is not safe due to the possibility of Datoga cattle raids. Cattle are watered at the communal pool in the vicinity of Kakesio-Osinoni (called '*Iltaana oudo*') constructed by the British as part of the Maasai Compensation Scheme. People and smallstock get water from shallow private wells dug in the dry Kakesio riverbed. At the onset of rains (December/January), cattle are driven onto the plain and retreat shortly afterwards (January) from the approaching wildebeest. The latter's calving period (February-April) is spent in the foothills. In April and June grazing on the plains becomes possible again, but surface water disappears quickly, forcing cattle to come back to the Kakesio hills (Map 4). Severe shortages of water, grass, as well as high tick infestation, and the threat of cattle-raids are the main problems of the Kakesio area. As a consequence, low mobility of livestock within an ECF/BCT infested area causes high mortality rates (see below).

The mobility of the Esere herds is even more restricted. The whole dry season is spent in the area between Kakesio and Endulen, using water from the Esere springs. During the rainy season, cattle are driven onto the plain as far as Ndutu before and after the wildebeest calving period. During that period, livestock are 'locked in' by wildebeest in their own locality and at the edge of the Eyasi Escarpment. Starting in the late 1980s, the people of Esere constructed simple, long, thorn bush fences (using mainly *Acacia Commiphora* branches) to preserve a section of plain for their cattle around their own locality. However, their efforts have never been totally successful and wildebeest often break the fence. The unwillingness of Esere herders to move cattle to higher pastures in nearby Endulen, is due to the fact that the *orpurkel* pastures in Esere have fewer ticks, and are relatively free of ECF/BCT compared with *oloirishirsha* pastures in Endulen.


MAP No. 4 GRAZING MOVEMENTS IN THE OLBALBAL - OLOIROBI - ENDULEN AREA
DRY/WET SEASON GRAZING MOVEMENTS
LATE DRY SEASON GRAZING MOVEMENTS TO FOREST GLADES
WATERING MOVEMENTS
SPRING
FAN-LINE SETTLEMENTS
PERIOD OF STAY (EG. FEB-APR.)
OLDEANI Mt.
MALANJA DEPRESSION
OLOIROBI
ESIRWA
LEMAGAROT Mt.
ENDULEN
ESERE
KAKESIO
EYASI ESCARPMENT
NGORONGORO CRATER
OLOMOTI CRATER
FOREST RESERVE
FOREST
RESERVE
MALANJA'S SLOPES
NDUTU
NASEK
OLDUVAI
WILDEBEESTS
SANJAN CATTLE
MALAMBO
OLBALBAL CATTLE
GOL CATTLE
OLBALBAL SWAMP (SEASONAL)
GOL Mts
OSUPUKO
OLOISHIRSHI
ORPURKEL
07-12
12-01
05-06
01-05
02-04

AREA COVERED BY MAP 4



2. Endulen <--> neighbouring Serengeti plain

All Endulen localities on the slopes of Mount Lemagarot (including Kaitakiteng, which belongs administratively to Oloirobi village) have a seasonal grazing pattern which is a version of the one at *osupuko* <-> *orpurkel* (Map 4).

During the rainy season, all cattle are kept in the intermediate zone (*oloirishirsha*) in the vicinity of the settlements. After the rains, they are driven down to the *orpurkel* (nearby outskirts of the Serengeti plain). They stay there until the end of June when grass and water pools dry up, coming back to their original localities for July and August in order to take advantage of the grass in the *oloirishirsha* zone which is still green. Cattle are watered at the upper Olmekeke tank and from several permanent streams flowing from Mount Lemagarot to lake Eyasi. Starting from September, the *oloirishirsha* grass loses its quality and the Endulen localities divide into two groups. Localities closer to lake Eyasi move to the Esirwa area, which is shared with Oloirobi cattle, or closer to the Eyasi escarpment. Reserves of good quality, medium high grasses still remain, and water is also available. However, the area is tse-tse fly infested which is a serious deficiency.[19]

All other localities near to the plain move cattle down to the southern outskirts of the plain where they graze on the remains of the short grasses. Cattle are watered every second day at the lower Olmekeke tank or Endulen streams. The availability of water permits extensive utilisation of dry plain grasses.

Partial maintenance of the pipeline constructed by the British has been carried out by the Danish Volunteer Service. However, this is unfinished, despite the promise of Maasai labour and their high expectations. The grass and water from the lower tank are also used by dry season migrants from Sanjan localities on the Salei plain. In other places valuable dry grasses are usually underutilised, due to lack of water or the fear of cattle raids in the Ndutu area.

3. The Gol mountains <--> Olbalbal, Masek

Maasai from the Gol mountains have the most unusual herding pattern in the area (Maps 3 & 4). Before the wildebeest became so numerous, they followed the usual *osupuko* <-> *orpurkel* pattern already described. However, since the 1970s, they have completely altered their migration pattern. During the rainy

[19] Veterinary drugs against trypanosomiasis spread by the tse-tse fly are relatively cheap, but not readily available in the Ngorongoro area. The Maasai therefore regard tse-tse fly infestation as a serious constraint on their grazing movements.

season, they stay with their livestock in the upper parts of the Gol mountains, being practically 'locked in' by the wildebeest. In the dry season, cattle graze the remaining grass on the Angata Kiti and Lemuta plains, but later most of them, due to severe shortage of water (there are only a few private springs and wells), move together with Malambo cattle to Olbalbal and Olduvai/Masek areas. In recent years, for security reasons, they do not move to Ndutu.

In early 1993, the Emunge pipeline (from Nainikanoka) was extended westwards to the *oloirishirsha* zone on the Olomoti slopes. The place called Irkaragarien is used by Gol cattle from the plain, reducing the pressure on the Olbalbal water sources.

4. Oloirobi <--> Olbalba

Oloirobi grazing patterns are diverse. In the past, people of this locality lived permanently on the floor of the Ngorongoro Crater in peaceful co-existence with wildlife. Oloirobi is composed of many widely dispersed localities, ranging from those at Ilmesigio on the eastern slopes of mount Lemagarot to Oloirobi proper, and those at Indepesi above Olbalbal. Oloirobi herds migrate extensively throughout the year between different highland localities, with only short periods of grazing in the lowlands (Map 4). Oloirobi herds are permanently divided into two roughly equal parts. One stays in Oloirobi in the dry season, the other at Indepesi, far from the main Oloirobi village. The majority of families divide their herds into two parts and keep them in both places, while a minority choose only one location. Cattle are exchanged between both groups within each family herd according to need.

5. Cattle of the Oloirobi group

Throughout the dry season, cattle of this group stay permanently in Oloirobi, grazing within the vast area of the present village. Calves and sick cows have separate reserved areas (*olokeri*) within the village. Livestock are watered at several communal springs and shallow wells in the area. The most important of these, although insufficient, is the spring at Loloueru. The Serena Hotel Group has applied for the right to use this source. However, as the shortage of water in the village is severe, the NCAA permits the Oloirobi Maasai to water their cattle at the springs on the floor of the Crater during the dry season, which also allows access to salt-licks.

At the end of the dry season, some cattle belonging to people living in the localities of Ilmesigio, Mokilal and Enkuriong Oloirobi are taken to the Esirwa

area, close to the Eyasi escarpment. The grass is of the *oloirishirsha* type and is still better than that found at the main village. In the case of a prolonged dry season, cattle are driven into the forest on the slopes of Olomoti. The limiting factor for the permanent use of Esirwa pastures is the high tse-tse fly infestation. However, just before the rains in December/January, all the remaining Oloirobi-based cattle are temporarily taken there, despite this threat.

Esirwa, situated on the eastern slope of the Ngorongoro massif, is one of the first places in the whole area to receive rain. Cattle either stay there or in the main village during the early and mid rainy season. In April-May, they are rapidly moved to temporary settlements on the Malanja along the Seronera road. The Oloirobi group meets there with the Indepesi group, and after the end of the calving period both groups are taken as far as Olduvai and Masek to graze *orpurkel* grasses. In June, both groups come back to their homesteads on the Malanja slopes, and the Oloirobi group, due to lack of water, heads back to Oloirobi.

6. Cattle of the Indepesi group

These cattle are permanently moved between Indepesi-Malanja slopes and Olduvai/Masek areas, controlled only by a few families and a number of warriors. During the dry season, cattle are kept in the Indepesi area, access grazing in the *osupuko* zone, and get water from the Crater floor or rivers flowing from Olomoti. People live in the Indepesi area in semi-permanent settlements (*enkutoto osumbat*). With the advent of rains, people move with livestock to Malanja in the *oloirishirsha* zone, grazing cattle as close as possible to the *orpurkel* grasses which are still occupied by wildebeest. Only a short period of grazing is possible there before calving starts. At the end of the rainy season, they are joined by the Oloirobi group and together they move down to the safe but parched *orpurkel* for about a month. In July, all cattle come back to the temporary settlements on Malanja, and again are divided into two groups.

7. Melenda area <--> Salei plain <--> Forest zone

The Eastern Highlands (Melenda) are the administrative equivalent to Nainokanoka ward and accommodate roughly half of the NCA Maasai and their livestock (Perkin, 1987). There are several villages in the area: Irkepusi in the south, Nainokanoka on the eastern slope of Olomoti, Embulbul, Bulati and Ngamat around the Embulbul depression, Alaililai and Sendui between Olomoti and Empakaai. On the other side of Empakaai crater lie Nayobi and Kapenjiro.

The vast upland pastures (*osupuko*) are currently densely covered by tough tussock grasses (*Eleusine jaegeri* and *Pennisetum sphacelatum*) which make livestock grazing difficult, as in the Oloirobi area. Adequate water-sources (rivers from the highland forest zone) are available only in the south of Melenda in the Irkepusi-Nainokanoka area. All other localities suffer from a relative shortage of water for livestock. The slopes of the Melenda massif are covered by medium high grasses and are classified as *oloirishirsha.*

In the past, during the rainy season, Melenda herders used to graze cattle on the Salei plain. However, since the 1970s, this has been severely restricted for reasons already discussed, resulting in poor health and low nutritional status of livestock. The current pattern is therefore typical of other highland NCA localities, although due to extensive use of forest glades, will be described separately (Map 3).

During the rainy season, Melenda cattle are moved down to the *orpurkel* for a few weeks before the wildebeest calving period starts in December/January and after it ends in May/June. Spare pastures are found on the plain north of Olbalbal (Makuria and Irkipori), Angata Kiti in the Gol mountains, the Sanjan area on the Salei plain, and the vast area called Irkereyani on the lower part of the Melenda slopes which extend from Sendui to Nayobi villages. This place is called Ngoisuk and is situated around the village of Engaruka in the Rift Valley outside NCA. Only in the latter two places can cattle remain throughout the rainy season as they are not in contact with wildebeest in great numbers. Cattle from all the other areas have to be withdrawn to the upland *osupuko* pastures, especially those in the Embulbul depression.

Each Melenda locality has regular rainy season destinations. Usually each locality prefers the nearest pasture, but individual herders may have a different destination from the others of his village.

The Maasai are not afraid to mix their cattle with hundreds of wildebeest that reside in the Embulbul depression throughout the year. They are said to have an earlier calving period than the plains' wildebeest (January-February), and their numbers do not present as big a health risk (Machange 1988).

Melenda cattle gain access to salt in the Ngorongoro Crater and on the Salei plain by drinking water from the salty Sanjan river at the beginning and end of the rainy season.

During the dry season between June and December, cattle are withdrawn from *osupuko* pastures on the plains due to lack of water. Until September, the majority are grazed in the vicinity of home villages. Individual herders are free to move with cattle throughout the vast Melenda area and graze pastures close to other localities. Maasai property law applies no constraint on this. However, another indirect controlling mechanism is at work. In principle, except in an emergency, each herd must spend the night in its home settlement, thus automatically limiting the radius of daily migration. However, starting from September, the *osupuko* grass starts to 'dry up', and relative water shortages create severe managerial problems, except in the Irkepusi-Nainokanoka area.

The Maasai claim that further prolonged grazing in the open *osupuko* pastures undermines the survival chances of livestock before the rains come. Using such reasoning, they send cattle accompanied by warriors to graze the forest zone. These pastures are situated mainly in the Forest Reserve, in which use is restricted. These moves are usually tolerated by the NCAA in the last period of the dry season. However, the Maasai sometimes enter the forests earlier than this.

Consequences for grazing the forest environment are not serious except in the case of fire (Struhsaker, *et. al.*, 1989), as confirmed by the NCAA (personal communication with Mr Mshanga). Opening up the forest for grazing could, however, potentially adversely affect this crucial water catchment area, on which the NCA and surrounding area depend.

Denying the Maasai rights of access to the forest would create immediate management problems that would increase the level of tension between the Maasai and NCAA. In addition, from the point of view of the customary land tenure, the Maasai have exercised rights to use forests for seasonal grazing. Each village has its own area in the forest where they have grazed for generations without any apparent negative results. A possible solution, which could possibly satisfy all sides, would be to reduce dependence on forest grazing, while at the same time assuring them access in cases of emergency. Policing such an agreement does not seem possible without formal Maasai involvement in the decision making process.

Case study of Olbalbal: Customary land and water rights and the ecological rationality of grazing movements

The Olbalbal case presents a model of the interrelationship between customary land and water rights, and the ecological rationality of the grazing pattern. These two factors shape local range management practices.

Olbalbal is the most overcrowded place in the whole of NCA. Its grass and water resources are utilised by cattle belonging to several groups of Maasai both from within and outside NCA. They are the permanent inhabitants of Olbalbal and Oloirobi from the Ngorongoro area, and Sanjan people from the Salei plain localities of Sanjan and Malambo. A large group come from the Gol mountains each year, and they are regarded as the Sanjan people.

The slopes of the Ngorongoro massif can easily accommodate all these livestock as well as tens of thousands of wild ungulates which cross the area on their way to the Ngorongoro Crater. There is no sign of range degradation, other than bush encroachment on the previously open savanna, possibly caused by the NCAA ban on grass burning. On the other hand, the Maasai insist that because of the shortage of water, grass in the *oloirishirsha* zone is never fully utilised, thus aggravating grazing pressure in *orpurkel* and *osupuko* zones.

Topographically, the whole of Olbalbal (plain and slopes) is divided into three easily discernible parts with different vegetation types equivalent to the *orpurkel*, *oloirishirsha*, and *osupuko* zones. These latter terms will be used instead of the various local names of different areas (see Map 4).

The *orpurkel* zone is divided into two sub-zones: the first comprises the vast flat Olbalbal depression, where a shallow swampy lake is formed in the rainy season. The remaining flat area around the lake is either covered by forests (Oltepesi, Emurwa Eseki) or by open short-grass savanna (Angata Elongola). Privately owned shallow wells around the lake provide a limited amount of water for livestock in the dry season. However, during most of the rainy season the whole area is occupied by wildebeest and not accessible to cattle.

The second area is at the foot of the highland slope, covered by forest at lower levels and by a zone of short grass interspersed with pockets of bush higher up. Its local name is Meshili, and the lower part of Olbalbal village is located there, including the NCAA post office and shops. As a result, wildebeest never enter this part of *orpurkel*, and the area is safe though insufficient for cattle grazing

in the rainy season. Three cattle troughs of the Olbalbal communal pipeline are also located here.

The *oloirishirsha* zone is further up the slope and is covered by medium high grasses and bush. Other Olbalbal permanent settlements are situated in this zone, as well as a cattle trough and two tanks. Some of the numerous private springs on the slopes of Olomoti are also found here.

The *osupuko* zone starts well below the level of the Crater rim and covers the vast area around it. The main types of vegetation are high moist grasses and forest, especially on Olomoti. This zone is jointly inhabited by Olbalbal and Oloirobi people. The former live slightly lower down (this is the upper limit of the Olbalbal permanent settlements), and the latter slightly higher, close to the Crater rim and Indepesi. The group of permanent settlements are called Osumbat. Additionally, at the end of the dry season, some of the Melenda-Irkepusi cattle are also often taken there. Water is easily available from the many streams flowing down from Olomoti, either on the Olbalbal side (all individually-owned, but shared with clan members and neighbours), or to the Crater (where they are larger and are all communally owned, such as Layanai, Emasitai and Engosiki).

Land and water use in the Olbalbal area

Land use in the Olbalbal area is a more complex than the traditional *orpurkel* <-> *osupuko* model. Olbalbal cattle are divided into *orpurkel*, *oloirishirsha*, and *osupuko* groups. *Osupuko* Oloirobi cattle are kept permanently in the area. During the dry season, the *orpurkel* Sanjan and Gol cattle are also taken there. Each of them, therefore, have a different preferred zone for grazing. In this way, cattle from these three localities usually do not compete, although they share some of the same resources. However, their number creates enormous organisational problems.

At the advent of rains, Olbalbal and Oloirobi cattle from all zones move, as far as possible, onto the plain. They retreat soon after, being pushed back by wildebeest. Cattle have to be withdrawn from the plains at the latest by the beginning of the calving period, which usually starts in January or early February. Retreating cattle ascend the slopes reaching their zones of usual habitation, where they stay until the end of the calving period. Wildebeest never climb the slopes, although they graze in the vicinity of the lower village. In late April or early May, cattle go down again to graze the still green grass. They are watered initially from open surface pools, and when these dry up from the

lower cattle trough of the Olbalbal pipeline. Owners of the wells at the lake can get water there. In July, Olbalbal cattle are withdrawn from the plains (together with those from Oloirobi) for three reasons:

(1) due to the relative shortage of water in relation to the number of cattle,

(2) to accommodate Sanjan cattle arriving from the Salei plain and Gol mountains,

(3) in order not to lose their limited resistance to ECF/BCT by prolonging their stay in the almost tick-free *orpurkel.*

A limited number of Olbalbal cows with calves are kept in the *orpurkel* zone for milking by local residents.

The majority of newcomers from Sanjan settle in Olbalbal, while a minority continue further south to the Ndutu and Masek areas, or to the lower lying localities of Endulen. These proportions are reversed with respect to the Gol mountains' Maasai. Those who choose Olbalbal join permanent residents in their homesteads or build temporary homesteads of their own in the lowest lying part (Meshili) of the *orpurkel* zone.

The Sanjan/Gol mountains' Maasai are accepted at Olbalbal whatever the condition of grazing resources. However, there are conditions that regulate their access to pastures and water:

(1) they are required to observe the borders of *olokeri* and instructed 'not to hide cattle there, only calves, as we do',

(2) they are only to water weak cattle, calves and smallstock in the lower cattle-trough (in rotation with the locals). All mature cattle have to climb up to the *oloirishirsha* zone and drink water from private streams, and not from the upper cattle trough where the supply of water is hardly enough for local cattle,

(3) Sanjan visitors are also instructed about the rules and restrictions of the Conservation Area.

Analysis of the system from the point of view of property rights

Oloirobi herders are the primary users of the Malanja slopes, where they have temporary settlements in the rainy season. However, in the *osupuko* zone of Olbalbal they live together with Olbalbal people. The *oloirishirsha* and the *orpurkel* zones within Olbalbal are primarily used by local people, although the *orpurkel* zone in the dry season is shared with those from the Sanjan/Gol mountains. Nevertheless, local people's rights are secure because Sanjan *orpurkel* cattle cannot graze in *oloirishirsha* due to the risk of tick-borne diseases. In reality, they do take this risk, but only for a few hours every second or third day in order to water their livestock from private streams in this area.

Olbalbal people accept Sanjan/Gol mountains' cattle in the *orpurkel* zone as they know there is not enough grass and water in the Sanjan or Gol mountains. They understand that they have no other choice, and that people from the Sanjan/Gol mountains have acquired customary secondary user rights after years of practising these long-distance migrations.[20] The issue of reciprocal access to Sanjan pastures (the Malambo-Olchorro bushland) in the rainy season has often been raised by Olbalbal informants.

It might seem from the above that there are no customary mechanisms limiting the number of seasonal users of the Olbalbal ecosystem. However, the main limiting factor is access to water which in fact regulates access to pastures.

The main reliable source of water in Olbalbal is the communal pipeline. It was built in the 1960s and reconstructed in 1987-89 by the village committee which currently takes care of its maintenance. Nearly 30 kilometres long, the pipeline brings water from the Endondol river flowing from Olomoti to the lowest part of the village, with a cattle trough in the *oloirishirsha* zone. As the whole village community participated in the reconstruction of the pipeline their communal rights have been strengthened.

Water is scarce and cattle are watered every two to three days using a rotational system. At least three streams in the *osupuko* zone are communally owned, but the majority (six springs) are individually owned by different permanent

[20] In light of this, the suggestion of restricting Oloirobi and Sanjan/Gol mountains' cattle to Olbalbal should be reconsidered (Machange 1988). They have the customary right to do this and this is the foundation of relationships between different communities in 'Maasailand'. Moreover, even on technical range management grounds, there is no need to restrict them.

inhabitants of Olbalbal. The owners share water with their male relatives, but also with other relatives, neighbours and friends, as well as with seasonal visitors. The remaining water sources in Olbalbal are shallow hand dug wells near the lake. This water is also shared with clan members and relatives, usually in return for their labour.

People from the Sanjan/Gol mountains have neither user rights to communal water, nor do they own any source of water individually. However, their calves and weak cows get access to piped water, but only in the lowest zone where they are in greatest numbers. To get water for other cattle, they must individually seek permission from relatives, clan members or friends who have property rights to springs, streams or wells. Permission is usually granted if there is sufficient water, but this uncertainty plays an indirect role in limiting the number of seasonal migrants.

Therefore, the combination of environmental constraints (higher disease burden in the upland pastures) and property rights to land and water sources constitute the customary system of range management and land use in the Olbalbal area. This system has proved to be flexible and efficient, and so far has prevented land degradation in this area.

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IIED'S DRYLANDS PROGRAMME

The Drylands Programme at IIED was established in 1988 to promote sustainable rural development in Africa's arid and semi-arid regions. The Programme acts as a centre for research, information exchange and support to people and institutions working in dryland Africa.

The main fields of activity are:

- **Networking between researchers, local organisations, development agents and policy makers. Networks help exchange ideas, information and techniques for longer term solutions for Africa's arid lands.**

- **Support to local organisations and researchers to encourage sharing of experience and ideas, capacity building and establishing collaborative links.**

- **Action-oriented research in the practice and policy of sustainable development in Africa's drylands, focusing on the variability of resources and incomes on which populations depend, development-oriented research methodologies, and natural resource management systems.**

Pastoral Land Tenure Series

A programme for research support and institutional collaboration on pastoral land tenure in Africa was established in 1991.

The programme's goals are:

- **To influence the formulation of land use policy through the generation of research findings that support and inform the debate on common property resource management.**

- **Contribute to the resolution of conflicts over land.**

- **Clarify the policy options available to national planners and donor agency personnel.**

- **Provide the basis for more efficient land use in pastoral areas of dryland Africa.**

A series of papers arising from this work will be published with a view to making relevant information available to policy-makers and development practitioners.

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