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DYNAMICS OF CONTINUITY AND CHANGE IN PASTORAL SUBSISTENCE AMONG THE RENDILLE IN NORTHERN KENYA: WITH SPECIAL REFERENCE TO LIVESTOCK MANAGEMENT AND RESPONSES TO SOCIO-ECONOMIC CHANGE

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ABSTRACT This study investigates how a pastoralist people of the arid regions of East Africa have coped with complex natural and socio-economic environmental changes by means of a case study of the Rendille people in northern Kenya. The study is based not only on data collected during 18 months' fieldwork, but also on detailed comparisons with previous studies from anthropological and ecological perspectives. The results show that the current pastoral subsistence of the Rendille constitutes a comprehensive system involving both pastoral production and associations with the local economy. The pastoral production system consists of the political and social centers offered by the settlements and the pastoral production sector of the livestock herding camps. Its place in the local economy is reflected, mainly, by contacts with the developing towns. By continuing with the communal utilization of land and water resources, specializing livestock management tasks in herding camps, and forming cooperative relations that based on important social institutions, the Rendille are able to maintain the flexibility of, and improvement in, livestock management and pastoral strategies. In addition, the process of combining challenging new economic activities and developing pastoral production systems illustrates the dynamics of pastoral subsistence today.

Key Words: Pastoral subsistence; Environmental changes; Livestock management; New economic activities; Rendille.

THE RESEARCH FRAMEWORK

I. The Study of Pastoral Subsistence

The natural environment of East African arid and semi-arid areas is characterized not only by high temperatures and low annual rainfall, but also by harsh climatic changes, which are often described as "uncertain" or "unpredictable." These distinctive features are apparent in the environmental changes that have occurred in recent years. For example, 1996 was a year of drought, but five times the annual precipitation was recorded under the influence of El Nino between 1997 and early 1998 (Galvin *et al*., 2001). However, another severe drought occurred late in 1998 and continued until the early part of 2001; it was reported as being one of the worst droughts in East Africa in the past 40 years (WFP, 2000). While severe drought plagued southern Ethiopia in 2001, northern Kenya had relatively stable rainfall during the short rainy seasons in December 2001 and December 2002. Nomadic pastoralists have lived in this arid land

for hundreds of years. By raising animals (camels, cattle, goats and sheep) and moving frequently for pasture and water, they have maintained a self-sufficient subsistence by relying on both livestock products and on the exchange of livestock for agricultural products with neighboring farmers or merchants (Smith, 1992).

Anthropological studies focusing on pastoral subsistence and its relationship to the natural environment can be traced back to the 1930s. Although most anthropologists at that time focused their research on the political and social systems of indigenous societies, as well as their religious and material cultures, Evans-Pritchard also took ecological factors into account. As he noted in his classic book, *The Nuer*, "Political institutions are its main theme, but they cannot be understood without taking into account environment and modes of livelihood" (Evans-Pritchard, 1940: 4). Evans-Pritchard devoted two of the six chapters of this book to descriptions of the ecology of the Nuer land and the influences of environmental factors, including rainfall, seasonal floods, droughts, and even harmful insects on the daily lives of people in the Nuer villages and camps. The book also addressed how environmental factors impacted the mobility of the people, as well as their mixed economic system of fishing, hunting, gathering, and cultivating, in addition to the herding of livestock.

In the 1950s and 1960s, new theoretical approaches and methods began to link the concepts of ecology (Odum, 1953) to the fieldwork of anthropologists, who not only studied indigenous culture but also interested in how such societies lived with their natural environments. These changes contributed to the provision of fundamentals for the new disciplines of anthropology, including cultural ecology and ecological anthropology (Steward, 1955; Rappaport, 1967). These ideas also were found in studies of East African pastoralists, such as Dyson-Hudson's *Karimojong Politics* (1966), which explored pastoral social organization in the context of an ecological framework. Dyson-Hudson's later work, in which he claimed that, "to understand herders, one must understand herding" (1972: 14), strongly encouraged researchers to integrate ecological viewpoints into anthropological studies on pastoral subsistence in East Africa (Fratkin *et al.*, 1994).

Advanced studies emerged in the 1970s and early 1980s as more researchers shifted their focus to the relationships between pastoral production systems and rangeland ecosystems using detailed data collection and analysis. Such studies include Dahl and Hjort's research on the Boran (1976), Sato's (1980) study of the Rendille, McCabe's (1985, 1987) studies of the Turkana, and Campbell's (1984) study of the Maasai. Despite their different endpoints and topics (including animal ecology, mobility, rangeland use, and drought response), collectively these studies present a comprehensive view of the ecological adaptive strategies of pastoralists living in arid and semi-arid environments (Ohta, 1998). These strategies are summarized below:

- Keeping communal rangeland and water resources, and maintaining high mobility for livestock as a response to unpredictable climate changes.
- Raising multiple species of livestock, and utilizing variations in the

livestock's productivity and biological adaptability among species in response to natural environmental uncertainty.
- Spatial dispersal of livestock herds to improve mobility and protect livestock from diseases, natural hazards, and marauders.
- Keeping maximum numbers of livestock in order to maintain stable self-sufficiency and absorb damages from unpredictable natural hazards.

All these studies suggest that pastoralists have successfully adapted to the natural environment and that their pastoral subsistence should be understood as a rational production system in the arid region of East Africa.

However, in the 1980s, the keywords used to describe East African pastoralists changed to terms such as desertification, survival, sedentarization, privatization, and marginalization. The main areas of research became rangeland use and resource privatization (Baxter & Hogg eds., 1990; Campbell, 1993; Galaty, 1994), sedentarization, population growth, and differentiation of wealth and poverty (Fratkin & Roth, 1990; Fratkin, 1991, 1998; Spencer, 1998). Researchers also studied regional economic systems, development, and markets (Hogg, 1980; Anderson & Broch-Due eds., 1999; Zaal, 1999). Compared with research in the 1960s-70s, which combined a detailed description of pastoral activities and adaptive strategies within ethnographies, the studies in the 1980s and early 1990s concentrated on reporting socio-economic changes and problems faced by pastoralists, and attempted to seek possible solutions and suggestions for policy making and development. Consequently, a notable difference had been presented by research between the 1960s-70s and the 1980s-90s. This difference suggests that the 1970s-80s can be considered as a period of change for both pastoral societies and the researchers studying these societies.

Historical studies have shown that pastoralists once dominated regional politics and the regional economy, and were respected as a central part of the regional networks of East Africa, prior to British colonial rule (Sobania, 1980, 1991). However, during the periods of colonial administration and the establishment of the new independent government, the pastoralists in the region have been politically marginalized, especially those who were forced to leave their rangeland for a more arid and harsh environment (Sobania, 1993; Waller & Sobania, 1994). However, as ecological and anthropological studies from the 1960s-70s have shown, most pastoral societies were able to maintain a livestock-based economy and practice their well-developed adaptive strategies until the 1970s.

In 1982-84, a severe drought extended into East Africa and led to a massive famine in south Ethiopia. The global famine relief events that followed this drought triggered development projects by both international development agencies and national governments in East Africa. Though these various projects began in a similar fashion by distributing food, they all had different methods and long-term goals. The projects supported by the World Bank sought to transform subsistence pastoralism into the beginnings of commercial livestock production and to establish a modern, market-oriented animal husbandry system (Dyson-Hudson, 1985). The development goals of national governments were

to integrate nomadic pastoralists into national political and economic systems (Kituyi, 1990). Finally, the large-scale international development projects, such as the UNESCO-IPAL (Integrated Project in Arid Land 1976-85) sought to prevent global desertification by reducing conjectured overgrazing (IPAL, 1984).

Undoubtedly, these projects impacted pastoral societies; therefore, the majority of researchers in the 1980s turned their attention to both external influences and internal changes with respect to pastoral societies as a result of the projects. As McCabe wrote in the early 1990s, "Traditional pastoral peoples seemed to have disappeared from the recent literature.... This shift in the pastoral literature may be more reflective of a shift in research priorities than of a major change in the subsistence economies of pastoral people" (McCabe, 1994: 69-70).

In the 1990s, studies on East African pastoral subsistence evolved in a variety of directions, and new theoretical approaches emerged from the viewpoints of both development issues and ecology. The World Bank publication, *Putting People First*, stated that development projects should consider the existing local culture, as "people are - and should be - the starting point, the center, and the end goal of each development intervention" (Cernea, 1985: ix). By focusing on the livestock development in East Africa, Dyson-Hudson pointed out that, "Traditional range systems for livestock production in tropical Africa are not as simple as their frequently simple tools would imply.... The skills of African herders are ingenious and their knowledge is extensive.... A characteristic of first-generation African livestock development plans is that they were rooted in what now seem oversimplified models of traditional livestock production and savanna ecosystem dynamics" (1985: 159). On the other hand, the emergence of the "new ecology" has both challenged the "balance of nature" that has been a long-held tradition in mainstream ecology and shaken the social science that has linked previous research with the equilibrium view of ecological systems (Scoones, 1999).

One of the key concepts of the "new ecology" is the non-equilibrium theory, which has been supported by studies on arid rangeland ecosystems. For example, results from the study by Ellis and Swift (1988) on the Turkana land of northern Kenya have shown that the concept of carrying capacity, which has been used for controlling the numbers of livestock through a conjectured balance between availability of forage and the animal population, cannot be used to explain the interaction of plants and livestock in the Turkana land. Since both the conditions for plant growth and the livestock population are strongly limited by the fluctuating climate, including erratic rainfall, and frequent drought, the ecosystem of the Turkana land resembles a drought-driven system (Ellis & Swift, 1988; Ellis, 1995). Referring to this drought-driven model, Behnke and Scoones have concluded that in non-equilibrium grazing systems, "the physical conditions supporting plant growth vary widely, and consumption by herbivores does not control plant biomass because the animal population itself is held in check by the same physical factors that control the vegetation" (1993: 11).

A significant perspective that the non-equilibrium theory has contributed

to current research involves the idea of opportunistic management of both livestock and natural resources by pastoralists. In contrast to the traditional concept of carrying capacity, by which pastoralists had been treated as the "cause" of overgrazing because they intended to maximize the number of livestock, the opportunistic management viewpoint sets a high value on the pastoralists' efficient use of resources in non-equilibrium systems. Several volumes have been published on this subject. They include *Range Ecology at Disequilibrium* (Behnke *et al*. eds., 1993), *Living with Uncertainty* (Scoones ed., 1995), and *Turkana Herders of the Dry Savanna* (Little & Leslie eds., 1999).

New ecological thinking on dynamics, complexity, and uncertainty has been recognized as highly suggestive in the field of social sciences in recent years. As Scoones has pointed out, "In the past, social science debates have often taken a static, equilibrial view of ecological systems, premised on assumptions about a balance of nature.... Such a selective view of ecological issues necessarily results in a partial and limited social analysis" (1999: 480). Concerning anthropological studies, "The literature on ethnoecology and so-called indigenous technical knowledge is vast. However, much of this work fails to interrogate the complexities of both ecological and social dynamics, and it retains a static view of both environment and knowledge" (1999: 485). Moreover, for further, advanced studies, Scoones has noted that, "Social, political, economic, and ecological processes interact dynamically, requiring analysis to be sensitive to the interaction of structural features and human agency across a range of scales from the local to the global" (1999: 492).

After reconsidering previous studies of pastoral subsistence in East Africa within the framework of new ecology, it seems reasonable to conclude that the majority of the studies conducted in the 1960s-70s tended to treat pastoralists as self-sufficient and isolated groups, owing to their main purpose on researching the relations between pastoralists and the natural environment, while the studies of the 1980s and early 1990s focused on the socio-economic changes wrought by development projects.

Today, East African arid and semi-arid areas are still occupied by many pastoral societies, although some groups have become semi-nomadic pastoralists and others have become agro-pastoralists. As most studies from the 1980s have indicated, pastoralists' lives have become more difficult and complicated. Not only have unpredictable natural hazards such as droughts and heavy rain damaged their livestock, but also sedentarization, an encroaching cash and market economy, and the privatization of rangeland has spurred them to change their pastoral activities or to give up the pastoral subsistence (Fratkin, 1991; Campbell, 1993; Sato, 1997, 1998; Ohta, 1998; Spencer, 1998; etc.).

In order to understand pastoral subsistence today, the traditional question of how pastoralists live with their environment should be expanded to ask how pastoralists live in relation to the complex dynamics of their environment. The ways in which pastoralists cope with both natural and socio-economic environmental changes constitutes a worthy subject for both scientific debate and discussions of development prospects, especially in the context of the new

theoretical approaches.

This paper presents a new case study of the Rendille pastoralists of northern Kenya. The study is based on my 18 months of fieldwork focused on the Rendille's herding and management of livestock, as well as on their responses to both natural uncertainties and socio-economic changes. I conducted detailed data analyses and comparisons with studies from the 1970s-80s, from both anthropological and ecological viewpoints, in order to describe the current pastoral subsistence. I then explored the dynamics of continuity and change in relation to pastoral subsistence within the context of the flexibility of, and improvement in, livestock management and pastoral strategies, in addition to the diversification of household economies in response to the growing cash economy in the local system.

II. Previous Literature about the Rendille

The Rendille are a pastoral people whose population numbered approximately 27,000 in 1989 (Republic of Kenya, 1994) and more than 30,000 in 2000. They raise camels, cattle, goats and sheep, and inhabit, in the main, the central lowland of the Marsabit District in northern Kenya, which is one of the driest areas in East Africa.

Anthropological studies on the Rendille could be traced to Paul Spencer's socio-anthropological study in 1960s. In his *Nomads in Alliance* (1973), he not only gave a detailed description of the Rendille social structure, such as the segmentary descent system and the age-set system, but also indicated that the relationship between the Rendille and their neighboring ethnic groups was strongly influenced by competition for natural resources.

In the 1970s-80s, Schlee (1979, 1989) researched the oral history of the Rendille and the Gabra, which he combined with comparisons of the Garre and the Sakuye. By focusing on cases of the same clans dispersed in different ethnic groups, he illustrated the emergence of inter-ethnic clan relationships and re-constructed the PRS (Proto Rendille-Somali) culture in his *Identities on the Move*. Sobania (1980, 1988) also studied the historical traditions of the ethnic groups in northern Kenya and southern Ethiopia, including the Rendille, but unlike Schlee, he started from a relatively recent period (after the 1840s) and focused primarily on the migration patterns, trade, networks, and bonds among these ethnic groups. Both researchers suggested that pastoralists subsisting in this area had built wide-ranging networks of alliances in response to a harsh and threatening environment.

Sato (1980, 1984, 1986, 1988, 1992a) first carried out ecological and anthropological research on the Rendille in 1975. He described the adaptive strategies of the Rendille from both anthropological and ecological viewpoints after collecting detailed data on livestock ecology, such as the dietary habits of the livestock, quantities of milk produced, age-sex composition, and population dynamics of herds. He also investigated livestock management strategies, such as movement patterns, seasonal fission and fusion of settlements and herding

camps. Such strategies will be reviewed in the following sections as means of exploring the current subsistence of the Rendille.

Fratkin (1986, 1991, 1993, 1998) has studied Ariaal society, a neighboring group to the Rendille, since the 1970s. His work includes both socio-ecological studies on household management of livestock and studies on development issues. His studies on the growth of Korr town (the place where my fieldwork took place) and the sedentarization of the Ariaal and the Rendille have provided useful information for this study.

III. Social Organization of the Rendille

Since Evans-Pritchard's pioneering study on the Nuer in 1930s, both the segmental descent system and the age system have been recognized as principal structures organizing East African pastoral societies. The Rendille have a patrilineal descent system composed of four categories: the moiety, the clan, the sub-clan, and the lineage group. Their society is divided into two moieties; the Eastern moiety consists of four clans (Saale, Urwen, Gaaldeylen, and Tupcha) and the Western moiety consists of five clans (Dubsahay, Nahgaan, Matarbah, Rengumo, and Uyam). Each clan has two to seven sub-clans, and each sub-clan has between five and thirty lineage groups.

This descent system is particularly relevant to the Rendille's subsistence. For example, settlements and livestock herding camps are generally made up of members of the same clan, and most of the animals gathered for the day's herding belong to persons of the same sub-clan or lineage. The "subsistence unit" is key to understanding the Rendille livestock management system, as defined by Sato (1980: 45), it is characterized as a cooperative camel herding group founded on clanship.

The Rendille age system shares features with that of the neighboring Samburu (Spencer, 1973). The Rendille system includes an age-grade, age-set, and generation-set for males, and an age-grade for females. Male age-grades are boyhood (*yeele*), warriorhood (*her*), and elderhood (*makhaabal*), and female age-grades are girlhood (*albe*) and womanhood (*oboorri*). A collective circumcision ceremony is held in every 14 years. Boys are initiated into a new age-set and become warriors after this ceremony. The young men of the previous warriorhood get married and become elders at this time, while girls are initiated into womanhood through marriage.

Generally, small boys and girls stay in the settlements with their parents, and begin herding small stock near the settlements or herding camps at the age of seven. Boys aged 10 years or older are sent to camel or cattle herding camps and girls are sent to small stock camps. Young men at the warriorhood age-grade are in charge of camel or cattle camps, and regarded as sources of defensive strength when the region faces insecurity. Most of the married men and women live in the settlements, where married men are in charge of local politics and rituals, and women are engaged primarily in housework.

Both the descent system and age system establish social relations and

structure daily life in Rendille society, including the management of livestock. An examination of how these social institutions function in response to a changing socio-economic environment allows us to explore the dynamics of continuity in pastoral subsistence.

IV. Organization of This Study

The fieldwork for this paper was conducted between 1998 and 2003 for approximately 18 months. Since one of the major study methods involves a comparison of my field data with the data collected from previous studies, I focused on the Tupcha clan's settlements in the Korr area of the Marsabit District, which is the same clan that Sato studied in 1976. The research findings have demonstrated that this approach has been effective as a way of examining both change and continuity in the Rendille society over time.

The ecological and socio-economic environment of the Rendille land will be described in the second section of this paper, as background to the research.

In the third section, the current pastoral subsistence will be revealed and analyzed in detail. In this section, I describe not only how the pastoral settlement and livestock herding camps were reorganized after the sedentarization of settlements near the permanent town, but also how the management of herds and the herding camps of different livestock species compare with data from previous studies.

In the fourth section, I describe the current household economy of pastoralists by analyzing growing economic activity between pastoral settlements and developing towns. Furthermore, I address how people have responded to the growth of a cash economy, and what factors have influenced their participation in new economic activities by exploring the dynamics of livestock value, and the ownership and utilization of natural resources, as well as the management of labor with respect to both herding and new activities.

In the fifth section, I summarize the current state of pastoral subsistence among the Rendille from both anthropological and ecological viewpoints. Finally, in the last section, I discuss the implications of these perspectives for understanding the dynamics of continuity and change in pastoral subsistence in East Africa today.

CHANGING ECOLOGICAL AND SOCIO-ECONOMIC ENVIRONMENTS IN RENDILLE LAND

I. The Ecological Environment of Rendille Land

According to the Kenyan government's administrative division, Rendille land lies within the Marsabit District of the Eastern Province. The District consists of six divisions, each of which is re-divided into 2-8 locations. The Rendille live mainly in the Laisamis and the Loyangalani Divisions.

Rendille land is one of the driest places in East Africa. The area ranges from 1°20′N to 3°15′N latitude and from 36°30′E to 38°E longitude, spanning approximately 15,000 km² of lowland with an elevation of nearly 500 m above sea level (Fig. 1). The Chalbi desert marks the northern boundary of the area, while Mt. Kulal (2355 m) marks the western boundary, and the Ndoto Mountains (2885 m) and the Mathews Range (2688 m) mark the southwest boundary. The district capital of Marsabit town sits at the top of Mt. Marsabit (1865 m), which is located in the northeast part of Rendille land. The main north-south road, linking Ethiopia and Kenya, passes through Marsabit town and the eastern part of Rendille land.

Most of the Rendille population live in the central lowland, which is known as the Kaisut Desert. The average high temperature in the shade is 39°C and the average low is 22°C, with little annual variation. The extensive daily sunshine leads to a great deal of global radiation and low humidity.

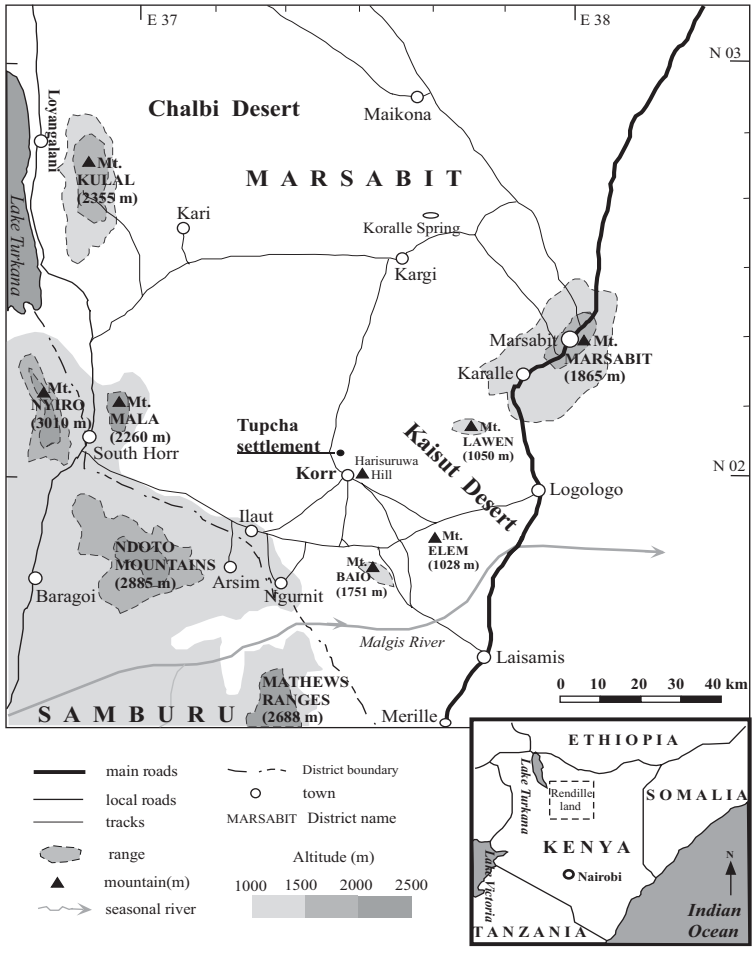


Fig. 1. Rendille land.

Seasonality in Rendille land is determined by rainfall, and the Rendille recognize four seasons: the short dry season (*nabahai-ki-gaaban*) starts in January and ends with the long rainy season (*guu*) from March to May; the long dry season (*nabahai-ki-deele*) commences in June and lasts until November; following this, the short rainy season (*yeel*) follows from the end of November to the end of December. Precipitation is strongly influenced by elevation and season. Fig. 2 shows the monthly rainfall over three years at two towns, the Marsabit town at the top of Mt. Marsabit, at an altitude of 1600 m, and the Korr town in the central lowlands at an altitude of 500 m. Rainfall patterns are relatively stable in the mountainous areas, with the maximum annual rainfall averaging more than 1000 mm. By contrast, rainfall patterns in the lowlands are both low and unpredictable, with an annual rainfall averaging less than 200 mm.

Vegetation in Rendille land is influenced by both elevation and precipitation. Generally, five vegetation zones are distinguished: forest, wooded grassland, bushland and thicket, semi-desert grassland, and desert (Lind & Morrison, 1974; Sato, 1980).

The forest zone extends throughout the mountainous regions that are more than 1500 m above sea level, and occupies approximately 5% of Rendille land. The vegetation is a mixture of needle-leaved trees and broad-leaved trees. The relatively low temperature and high humidity, as well as the thickly wooded forest, make herding livestock difficult in this region. In the 1970s and 1980s, agriculture was introduced to the Mt. Marsabit and Mt. Kulal regions by international development agencies, and small villages with farms were built near the tops of the mountains.

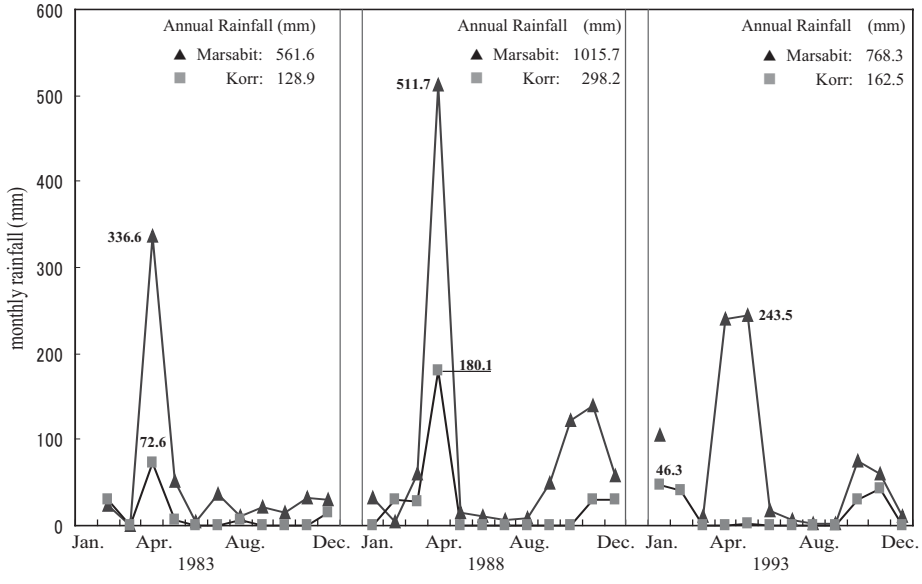


Fig. 2. Annual rainfall of Marsabit town and Korr town.

Wooded grassland is found at altitudes of 1200-1500 m in the mountains and valleys, and occupies approximately 5% of Rendille land. *Acacia tortilis* (*dahar*) is prominent in the upper strata, while the middle strata are fairly clear of vegetation, and grasses dominate the lower strata. Cattle and small stock (goats and sheep) are herded in this vegetation zone, but camels rarely come to these places owing to the high humidity and altitude. Another reason why the Rendille avoid these regions is the abundance of harmful insects, such as ticks and mosquitoes.

The bushland and thicket zone extends from an elevation of 600 to 1200 m, and is found both at the foot of the mountains and in the lava area. *Acacia tortilis* and *Cordia sinensis* (*gaeer*) are conspicuous in the upper strata, while the lower strata are covered with shrubs such as *Sericocomopsis pallida* (*giib*) and *Duosperma eremophilum* (*yabah*). This vegetation zone covers approximately 40% of Rendille land, and is used by all species of livestock. Unfortunately, a large area of bushland and thicket around Mt. Marsabit is covered with lava boulders, which makes it difficult for both humans and livestock to move.

Semi-desert grassland extends from an elevation of 400 to 600 m, and covers most of the central lowland of Rendille land. Trees more than 3 m high can be found only along the stream beds. Thorny trees less than 2 m (*Acacia* spp. or *Commiphora* spp.) are scattered throughout the middle and upper strata. The lower strata include sandy lands stippled by patches of bushes and herbs, such as *Sericocomopsis pallida*, *Duosperma eremophilum*, *Indigofera spinosa* (*kholo*) and *Blepharis linariifolia* (*lemaruk*). This vegetation zone accounts for approximately 40% of Rendille land, and is mainly exploited by camels and small stock.

The Chalbi Desert, located on the northern boundary of Rendille land, occupies nearly 10% of the total area and has little vegetation. Though the desert itself is not useful to the Rendille, the Koralle Spring (*wor-ti-magad*), the only surface water resource that can be used throughout the year, is located in the southern part of the desert.

With the exceptions of the regions on the top of the mountains and in the desert, more than 80% of Rendille land is used for pasture. As both the types and quantities of plants are strongly influenced by topography and rainfall, plant ecology is important to a study of the Rendille's livestock management strategies.

Fig. 3 shows the monthly rainfall in Laisamis town over five years.[(1)] Laisamis town is located in the southeast area of Rendille land, along the main road that leads to Marsabit town. In 1995, the annual rainfall was 188 mm, and most of the rain fell during the long rainy season in March and April. In 1996, a total of 100 mm of rain fell during the short rainy season from October to December. Thus, a short-term drought (or single-year drought) occurred between May 1995 and October 1996. From 1997 to the first half of 1998, more than 1,000 mm of rain fell, owing to the influence of the El Nino weather pattern. But during the second half of 1998 the area had only 25 mm of rainfall, followed by only 65 mm of rainfall in 1999. This shortage led to a severe

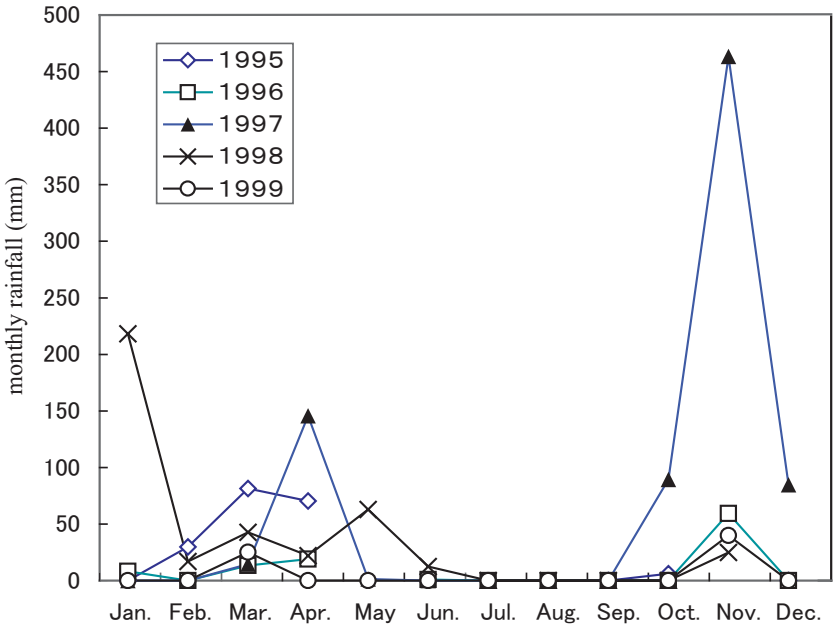


Fig. 3. Monthly rainfall data of Laisamis town (1995-1999).

drought between 1999 and 2001, which has been recorded as one of the worst droughts in East African history. In addition, rainfall patterns in the lowlands are usually short-lived and do not cover large areas.

The short-term climatic change is clearly illustrated in Fig. 3. The long-term environmental changes could be seen in the historical records of droughts. In the Horn of Africa (Ethiopia, Eritrea, Somalia, Djibouti, and northern Kenya), long-term droughts that had caused significant damage to pastoralists during the last two decades were recorded for 1982-1984, 1990-1992, 1996, and 2000 (Fratkin, 1998; WFP, 2000).

II. Pastoral Areas and Relationships with Other Ethnic Groups

Ethnic groups surrounding Rendille land from north to east include the Dassanetch, the Gabra, the Boran, and the Somali. From west to south are the Turkana, the Samburu, and the Ariaal (Fig. 4). Of these groups, the Dassanetch, the Boran, the Turkana, the Samburu, and the Ariaal subsist mainly on cattle and small stock, whereas the Gabra and the Somali subsist mainly on camels and small stock. By contrast, the Burji and Boran farmers who settled on the top of Mt. Marsabit cultivate maize and potatoes, the El-Molo subsist on fishing and herding near the eastern shore of Lake Turkana, and the Ndorobo subsist on hunting and gathering, in addition to herding cattle in the Ndoto Mountains.

Pastoralists inhabiting central and northern Kenya are generally divided into two linguistic groups, the Nilotes and Cushites (Whitely, 1974). The Turkana and the Samburu are Nilotic speakers, while the Rendille, the Somali, the

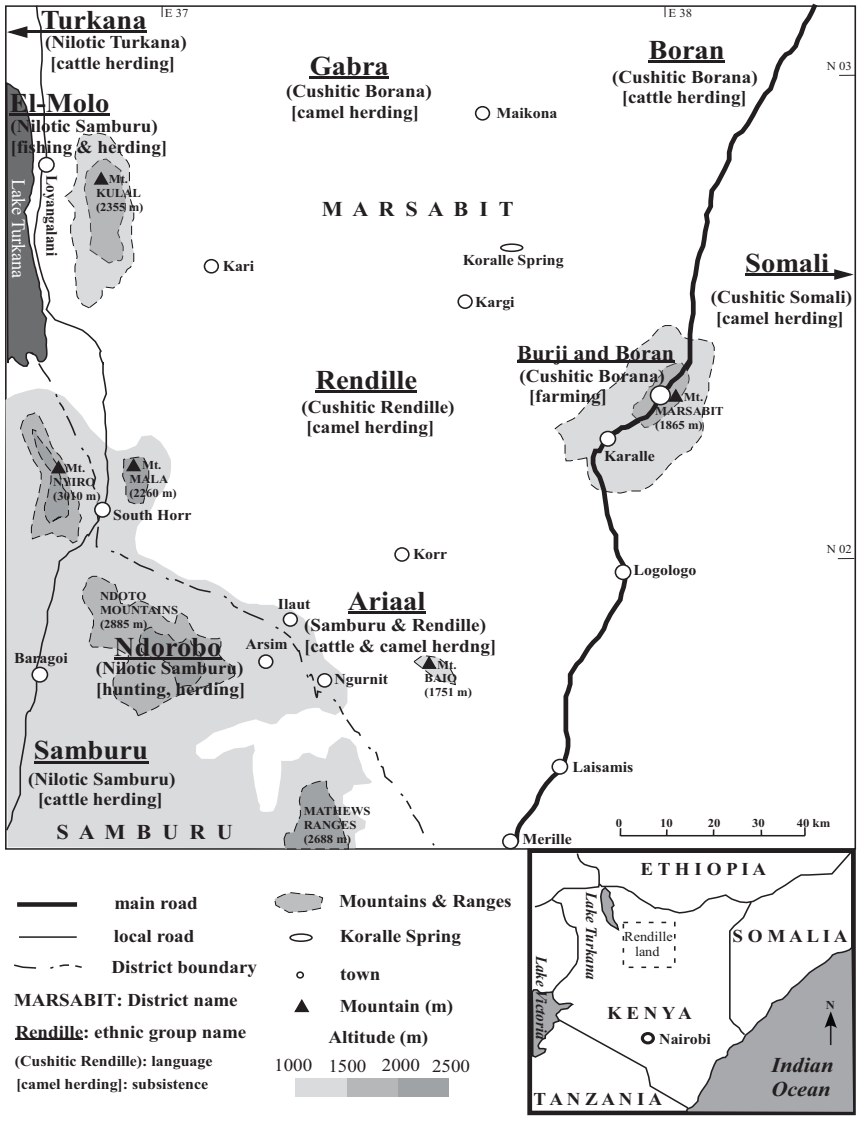


Fig. 4. Ethnic groups around Rendille land.

Boran, and the Dassanetch are Cushitic speakers. The Ariaal speak both the Rendille and Samburu languages, whereas the El-Molo and the Ndorobo mainly speak the Samburu language, and the Gabra speak the Boran language. These varieties of language used by different groups show the diversity of the ethnic relationships in the historic context.

The relationships between the Rendille and neighboring ethnic groups are unstable. Generally, the Rendille maintain friendships with the Ariaal and the Samburu in the south, whereas they recognize the Boran in the north and

the Turkana in the west as enemies. In 1992, when the allied forces of the Boran, the Dassanetch, and the Gabra raided the Rendille's camel camps and settlements near Mt. Marsabit, most of Rendille settlements moved to Korr, far to the south of the mountain region (Sato, 2001). Today, when drought occurs and the condition of the central lowlands becomes difficult for herding, instead of moving to the north or west, where the Boran and the Turkana live, the Rendille move their herds to the foot of the Ndoto Mountains, or even south to the Ewaso-Nyiro River in the Isiolo District.

The friendship between the Rendille and the Samburu can be traced to the nineteenth century, when the two groups formed an alliance in order to defend themselves against attacks by the Laikipiak (Spencer, 1973; Sobania, 1993). The fact that the camel herders of the Rendille and the cattle herders of the Samburu do not compete for pasture might also reinforce the stable friendship between these two groups. The Rendille, the Samburu, and the Ariaal share many similar cultural features, such as the segmentary descent organization, age system, and style of beadwork ornaments.

III. A Changing Socio-Economic Environment

Northern Kenya was of little interest to the British Colonial government, or to the independent Kenya government established in 1963. As a result, little investment was made in this region at that time and, until the 1960s, towns were found only along the main north-south road that linked Ethiopia and Kenya. In this situation, pastoralists were able to maintain self-sufficient livelihoods.

However, the political and economic situation in northern Kenya changed quickly between the 1970s and 1980s as a result of development projects provided by international development agencies and the missionary works of Catholic and Protestant churches (Fratkin, 1991, 1998). In Rendille land today, towns have developed along the main north-south road and inside the central lowlands. South of the district capital of Marsabit, the towns of Karalle, Logologo, Laisamis, and Merille now exist along the main road, and the towns of Kargi and Korr have been established in the central lowlands, 50 km to the west of the main road; in addition, the towns of Ilaut, Arsim, and Ngurnit have been established at the foot of the Ndoto Mountains (Fig. 1).

Before turning to a closer examination of the current pastoral subsistence of the Rendille, I focus now on changes in the local political and economic systems and the influence of these changes on Rendille society, including the development of Korr town and its impact on the Rendille's residential patterns (Fig. 5).

The place that the Rendille call *korr* is a rocky area near a large wadi, where ground water is found in shallow wells. The geographic position of the present Korr town is near the Halisurwa Hill.[(2)] The Rendille used Korr as a seasonal watering point until the end of the 1960s. In the early 1970s, an Italian priest built the first mission and a pumped borehole that supplied year-

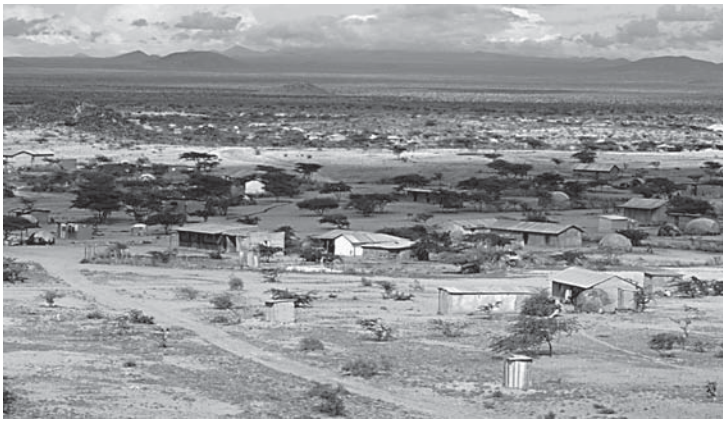


Fig. 5. Korr town (2001).

round water. Some Rendille were attracted to the area and began to settle there. In the 1980s, missionaries from the Don Bosco Mission took over Korr, and built a permanent church, school, water tank, and dispensary. Also, the Somali merchants, who had set up small huts to sell maize and general goods near the mission, built permanent shops and houses. Furthermore, the devastating drought in 1982-1984, and the severe raids by the allied forces of the Boran, the Dassanetch, and the Gabra in 1992, prompted many Rendille to move to Korr for relief (Fratkin, 1991; Sato, 2001).

Development projects had a strong impact on the growth of Korr town in the 1980s and the early 1990s. Large international development projects, such as the UNESCO-IPAL, invested in both scientific research and development in the Marsabit District between 1976 and 1985. Based on the idea that desertification is caused by human mismanagement of the rangeland, and that the pastoralists' habits of keeping large herds would cause overgrazing, the project aimed to reduce herds by promoting livestock marketing and commercialization. Since the project managers used the town mainly as a base for their activities, and distributed relief foods there during droughts, they attracted pastoralists to the town, and encouraged a cash economy. However, the project did not significantly improve the pastoralists' lives. After this project was disbanded in 1985, other projects appeared that focused on improving agricultural production on the top of Mt. Marsabit (Fratkin, 1998; Sato, 1995, 1997).

Today, Korr town consists of many permanent buildings and facilities, including a primary school, a nursery, a dispensary, and numerous shops. Missionary groups such as the Don Bosco Mission, the AIC (African Inland Church), and the BTL (the Summer Institute of Linguistics), as well as development organizations including the GTZ (German Development Corporation) have offices in the town. In addition to housing the Korr chief office, the town serves as a meeting place and as the administrative center of the region.

There are more than 20 large shops in cement buildings in Korr town. Most of them belong to Somali merchants, who sell food (maize, sugar, tea, cooking

oil, etc.), general goods (torches, batteries, matches, soap, etc.), and clothes. One Somali wholesaler transports goods from Nairobi (the national capital) or Marsabit to Korr by truck. Also, two shops sell the Rendille people's favorite chewing tobacco, *tombo*, including one shopkeeper from Meru. In addition to the large shops, there are small street stalls managed by the Rendille, usually by married women, who sell bead ornaments, plastic accessories, and perfumes derived from plants.

The sale of milk has become one of the most popular income-generating activities for women living in settlements near the town. More than 30% of married women from these settlements sell milk, and the money they earn is spent primarily on food (Nduma *et al*., 2001). However, such economic activities were not confirmed during my fieldwork in the Tupcha settlements. It seemed that only some of the women who lived in settlements close to the town sold milk.

Although livestock markets and auctions were introduced to Korr town during the IPAL project, so far there has not been any regular market for animal trading. Instead, the town has three butcheries where animals are sold and slaughtered for meat.

As noted above, Korr town is occupied primarily by people working for missions or development organizations, merchants, and by people seeking employment or relief. Compared with the pastoral settlements located outside of town, people who live in town have easier access to wage-paying jobs, education, and relief foods. However, the economy of the town relies mostly on cash, and living in the town is unpleasant and uncertain for people who do not have stable incomes. Some reports show that the malnutrition rate of children in the town is higher than that for those living in pastoral settlements because livestock products such as milk are less accessible in the town (Fratkin *et al*., 1999).

In 2000, the population of Korr was approximately 14,500, half of the total population of the Rendille people. This number includes about 2,500 people living in the town, and about 12,000 people living in more than 50 pastoral settlements outside the town (Fig. 6). Before the emergence of towns in the

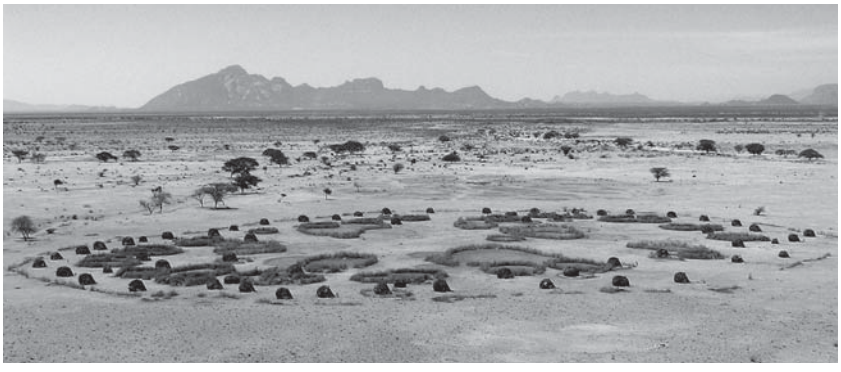


Fig. 6. A Rendille settlement near the Korr town (2001).

central lowlands, the Rendille's pastoral settlements had spread widely and they moved throughout the region. However, due to the government sedentarization policy, development projects, and drought relief efforts, most of pastoral settlements moved closer to towns. In the Korr region, approximately 50 pastoral settlements are located in a less-than-15 km radius around the town. Fig. 7 clearly illustrates the distribution of settlements around Korr town, with an aerial photograph taken in 2003. This change in residential patterns is one of the biggest changes in Rendille land in recent years.

In Rendille language, the word *gela* means "enter." The phrase used by people to express the present residential pattern, especially the settling of pastoral settlements around the town, is *taun gele* or "entered the town." A man who belonged to the Irikimaniki age-set (estimated age of 65 years) was asked about the current settlement, and he reported that, "When I was a warrior, the settlement was always moving. When rain fell in Mt. Kulal region, our settlement moved (to that place). When rain fell in Mt. Marsabit region, we moved again to that region. But now that we have entered the town, only the livestock keeps moving."(3)

As previously mentioned, the emergence and growth of towns, the rise of development projects, and the sedentarization of pastoral settlements to towns are among the major socio-economic changes that the Rendille have experienced during the last three decades. The influence of these changes on pastoral subsistence includes two elements.

One is the influence of changing residential patterns on the practice of pastoral adaptive strategies. As noted in the first section, the high mobility of humans and livestock is one of the most important adaptive strategies in pastoral subsistence. After the sedentarization of settlements, movement patterns of both people and animals tend to be reorganized, and management of both labor and livestock must be readjusted.

The other influence involves the encroachment of marketing and a cash economy on the livestock-based pastoral economy. Though the Rendille used to exchange their livestock products with farmers and traders for agricultural products and utensils, their livelihood remained based on livestock products. However, money has become more important and necessary not only for buying food but also for school fees and medical expenses. Therefore, I examined how the Rendille have responded to the growing cash economy.

CURRENT LIVESTOCK MANAGEMENT

The Rendille have a dual-residential system, which consists of the settlement (*goob*) and the livestock herding camps (*foor*). Studies in the 1970s highlighted this residential pattern and the fission and fusion of people between settlements and camps, and recognized this system as one of the most important adaptive strategies to an uncertain environment. As Sato (1980: 69) wrote:

> As the dry season advances, married people with young children are left behind in the

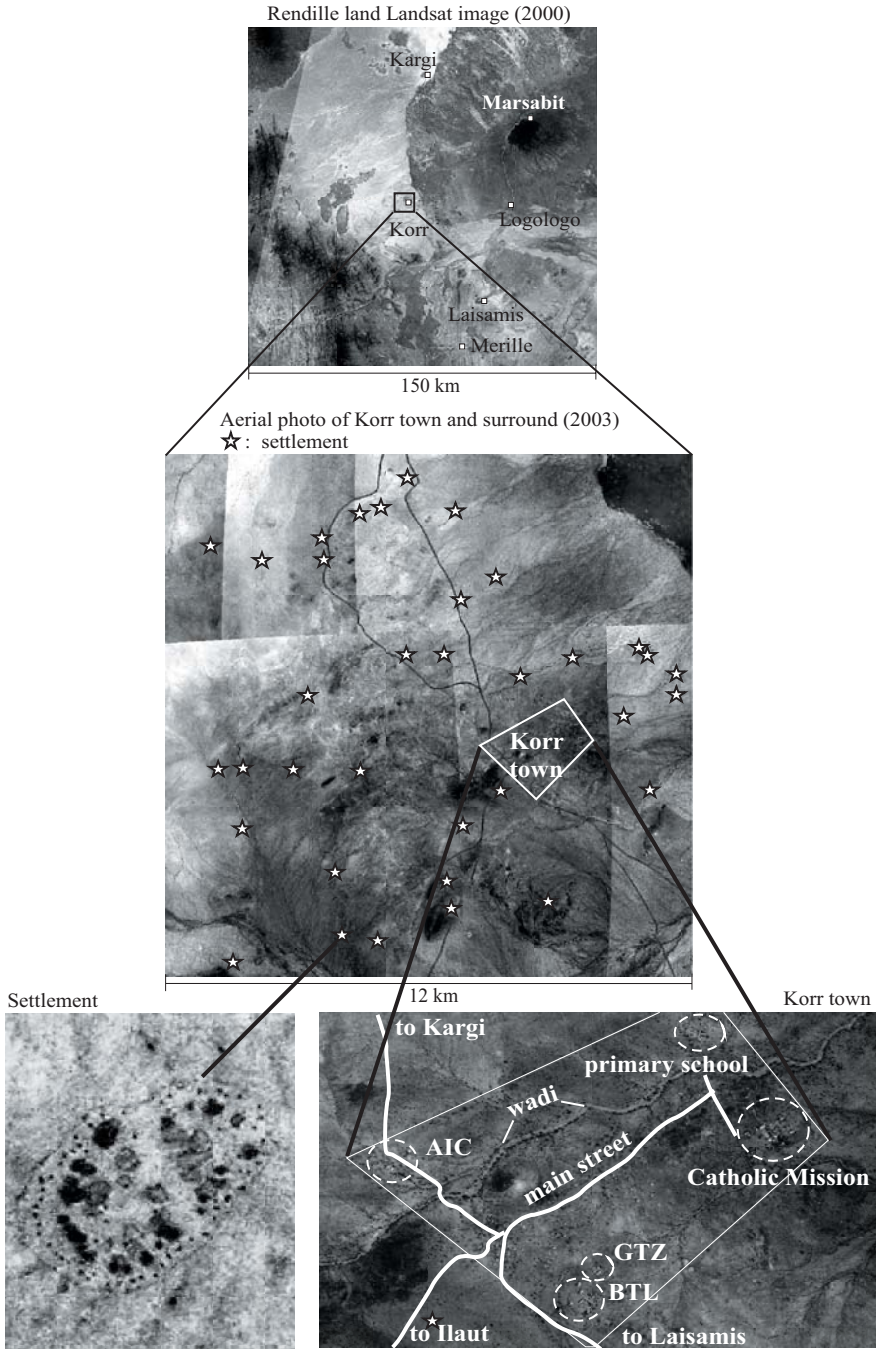


Fig. 7. The recent sedentarization of pastoral settlements near Korr town.

settlement, while the herders take the herds away in search of better pastures. Thus the dependants, or married people and children under 7 years of age, live in the settlement, whereas some unmarried people and those over 7 years of age live in the small stock camps; unmarried men live in the camel camps. After the rains fall, those people who were dispersed between herding camps and the settlement join together into the same area where fresh pastures and waterholes are available. In other words, camp-based herding dissolves into settlement-based herding.

However, during the research period for this study, although the dual-residential pattern of the "set" of settlement and herding camps remains, the seasonal fission and fusion of settlements and camps has ceased owing to the sedentarization of settlements near developing towns (Sun, 2002b). In this section, through detailed data examination and comparison with data from previous studies, I describe the Rendille's current livestock management and reveal the flexibility and development of pastoral strategies in response to environmental uncertainty.

I. Knowledge and Utilization of the Physical and Biological Environment

1. *Raising Multiple Species of Livestock*

Raising multiple species of livestock (camels, cattle, goats and sheep) is one of the most important adaptive responses of East African pastoralists to the natural environment. The pastoralists take advantage of the biological adaptabilities of different species, and they adjust to the quantity of livestock products for human consumption that are yielded by different species in different seasons (Dahl & Hjort, 1976; Sato, 1980; Dyson-Hudson, 1985; McCabe, 1985; Ohta, 1998). The Rendille are known as camel and small stock herders (Spencer, 1973; Sato, 1980; Fratkin, 1986), but in recent years they have been raising cattle as well (Sun, 2004).

The diversity of dietary habits, water requirements, quantity and duration of milk yield, fertility, and life spans of different livestock species raised in Rendille land are shown in Table 1. Camels and goats consume shrubs and trees for approximately 46% and 48% of their respective diets, whereas the diets of cattle and sheep comprise herbs and grasses that make up 96% and 78%, respectively, of their diet. Thus camels and goats are defined as "browsers," and cattle and sheep are "grazers." These feeding habits vary seasonally and spatially, and are related in part to the water supply. In a dry season, camels are watered every 10-14 days, cattle every 2-3 days, and small stock every 3-4 days. Camels and small stock are not watered in the rainy season, since the plants they eat contain plenty of moisture, and small pools can be easily found after a period of rainfall. However, cattle are watered every 3-4 days, even in rainy seasons.

The quantities of milk from each type of livestock are strongly influenced by feeding and watering conditions. On average, a camel can produce 2,220 ml of milk per day, which is two times as much as that produced by a cow

Table 1. Dietary, water supply, milk production, fertility and life span among livestock species.

	Camel	Cattle	Goat	Sheep
Dietary habits (%)[1]				
Shrubs & trees	46	4	48	22
Herbs & grasses	54	96	52	78
Water supply (day)				
Dry seasons	14	2 - 3	3 - 4	3 - 4
Rainy seasons	---	3 - 4	---	---
Quantities of milk production[2] (ml/head/day)	2220	1277	186	186
Length of lactation (month)[2]	26	20	5	5
Gestation period (month)[1]	12 - 13	10	3 - 4	3 - 4
Intervals of delivery (month)[3]	24	14 - 18	8-9	8 - 9
Age of given first birth (year)[4]	5 - 6	3 - 4	1 - 2	1 - 2
Life span (year)[1, 4]	25	20	10	10

1: Sato (1980)
2: Sato (1984)
3: Dahl & Hjort (1976)
4: Sato (1992a)

(1,277 ml) and 12 times as much as that produced by small stock (186 ml). Length of lactation for camels is about 26 months; it is 20 months for cattle and five months for small stock. Consequently, camels are considered the most stable milk-supply animal in Rendille land (Sato, 1984).

The Rendille raise Zebu cattle, which have adapted to the arid environment. They have a gestation period of 10 months and delivery interval of 14-18 months; compare this with the 12-13 months gestation period and 24 months delivery interval for camels. Therefore, the fertility and fecundity rates of cattle are higher than those of camels. This feature relates to later discussion of the increase in cattle numbers and the current influence of livestock markets.

Small stock first give birth at 1-2 years of age, and can give birth every year with a gestation period of 3-4 months and delivery interval of 8-9 months. Given this high reproductive ability, small stock are often used for both meat consumption and for selling or exchanging for agricultural products and general goods.

2. *Pastoral Range and Utilization of Natural Resources*

Fig. 8 shows the Rendille's current pastoral range on a Landsat image taken in 2000. The image covers an area 150 by 150 km from north to south and from east to west, with Mt. Marsabit in the upper right corner, Mt. Kulal at the upper left corner, and the Ndoto Mountains at the lower left, close to the center. The dark black color shows the forest region on the top of these mountains. Encompassing Mt. Marsabit, the section with a mixture of black and gray colors, which occupies nearly a quarter of the whole area, is a widespread lava region covered by bushes and thickets. Between this lava region and the mountains at the left and lower parts is a long shape with a mixture of

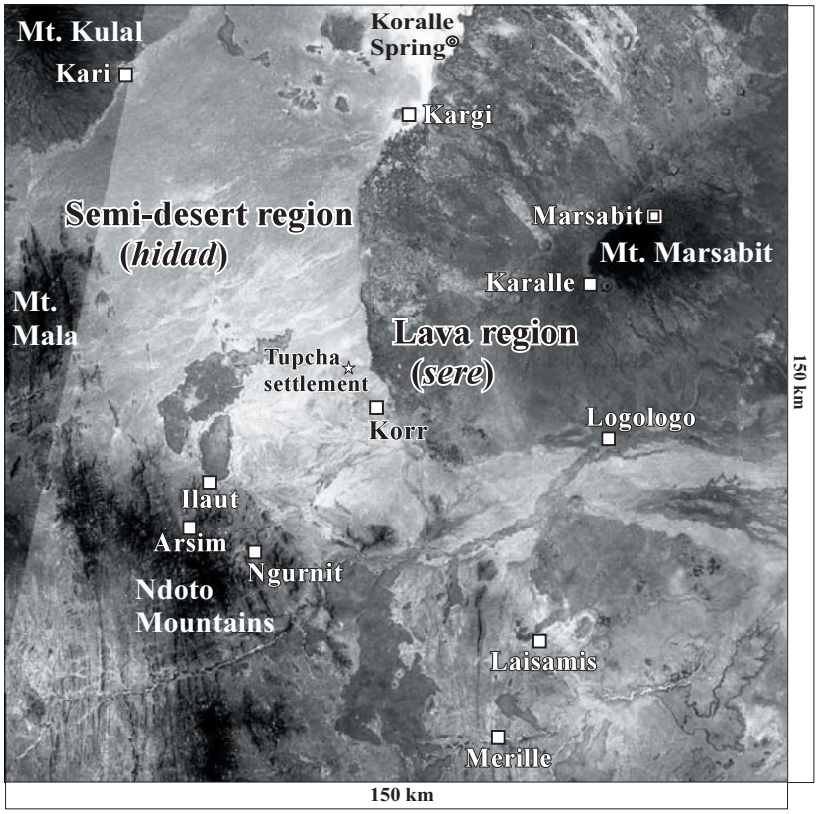


Fig. 8. Landsat image of Rendille land.

light gray and white colors, which indicates the central lowland where plants are sparse and the ground is exposed to direct sunlight. At the upper center, the small inverted-triangle area in white shows the south edge of the Chalbi Desert, where the Koralle Spring, the only permanent surface water resource of Rendille land, is located.

The central lowland region is often called *hidad* in the Rendille language, which means desert (Fig. 9). However, the herders have given detailed names to each part of the region, often using features of vegetation and soil type in their naming. Three terms: *tor*, *dobos*, and *kuya* are used, in the main, to classify the vegetation and geographic features of the lowlands. The term *tor* describes the open country where vegetation is rare and the ground is exposed to the sun. *Dobos* is a region with relatively dense bushes and trees, and *kuya* refers to dry swamps where the soil type is clay-sand, which is different from the sandy soil of the *tor.* During the rainy season, these *kuya* often become surface pools.

The central lowland region is distinguished by semi-desert grassland, widely stippled with thorny trees less than 2 m in height (*Acacia* spp. & *Commiphora* spp.), and bushes and herbs such as *Sericocomopsis pallida*, *Duosperma eremophilum*, *Indigofera spinosa,* and *Blepharis linariifolia* are scattered in

patches. Camels and small stock are herded in this region year-round, whereas cattle are seldom found there during dry seasons. During rainy seasons, cattle are taken to this region if the rainfall is relatively stable and the growth of grasses is confirmed. Since the sandy soil cannot store rainwater for more than three days, cattle herded in this region are watered at shallow wells near Korr town.

The lava region extends from Mt. Marsabit westward to the central lowlands. Since the edge of the lava region is covered with large lava boulders piled up 2-5 m in height, the whole region is called *sere,* which means "the high place" in the Rendille language. In contrast to the flat central lowlands, several lava domes (*kur*, 100-300 m in height) are located in the region. During the rainy seasons, streams flow down from Mt. Marsabit and water can be stored for a relatively long time. Compared with the shrubs found in the lowlands throughout the year, vegetation in the lava region varies seasonally and plant

Fig. 9. Semi-desert region (*hidad*).

Fig. 10. Lava region (*sere*).

Fig. 11. Koralle Spring.

biomass is relatively high (Fig. 10). Unfortunately, lava boulders cover the region, and obstruct the herding of animals.

The Koralle Spring (Fig. 11), which is located approximately 20 km north of Kargi town, is the place of the Rendille's origin according to oral tradition. The water from the Spring is highly alkali, which is considered beneficial for the health of camels and effective for curing human skin diseases. All Rendille's camel herds are watered at this Spring in dry season. With the exception of the Koralle Spring, wells near the towns are the only year-round water sources. There are two types of wells, the pumped wells in the towns built by missionaries in the 1970s, and the shallow wells dug by the Rendille near large wadis in recent years.

Water resource development has been recognized as key to development projects in arid and semi-arid areas in East Africa in the 1970s and 1980s (Republic of Kenya, 1991). In Rendille land, geographic surveys of water veins, sponsored by the GTZ and other international donors, were conducted along some large wadis, and the Rendille dug several shallow wells under the guidance of the development experts. However, in the 1980s, when global environmental problems received more attention than local development, water resource development was criticized for causing desertification. The critics presumed that water resources attracted and concentrated too many people and herds in limited areas, which led to degradation of vegetation and soil in those areas. However, despite the fact that no specific evidence was provided to prove that desertification was expanding in Rendille land, water source development projects stalled and were eventually disbanded.

In the early 1990s, while most development projects sought to improve agriculture on the top of Mt. Marsabit, the Rendille, who had learned well-digging skills and knew the places where ground water might be found, began to dig their own wells. Fig. 12 shows the distribution of wells dug by the people of the Tupcha and Saale settlements in Korr region, mainly between 1998 and 2001.

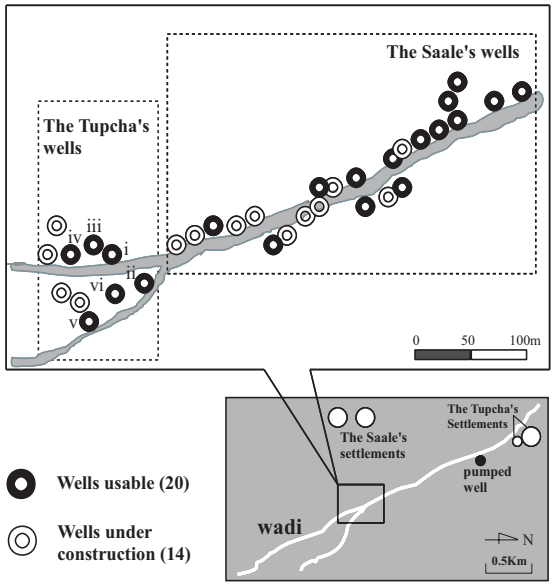


Fig. 12. An example of Rendille's well-digging (2001).

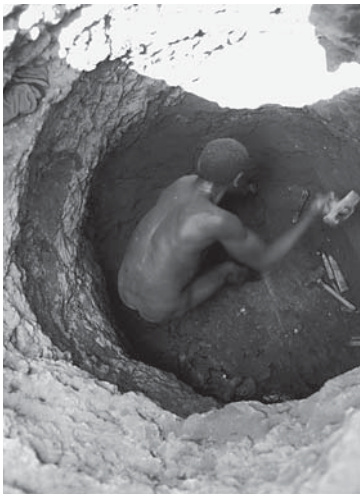


Fig. 13. Digging a well with hammers and iron sticks.

Thirty-four wells were dug within a 500 m area along a wadi. In 2001, twenty of these were used for watering animals, while the rest were under construction. When I first visited the Tupcha settlement in 1998, there were only two wells. Well-**i** was in use and well-**ii** was under construction. However, by 2001, the number of wells had increased to ten, with six of them (**i-vi**) available for use, while four were in the process of being built. The reason why the wells were concentrated in a limited area was that people believed that water could be found easily in places near wells that already had water. The ways in which people use these wells will be analyzed in following sections.

Digging a well in the central lowlands is a long, and arduous task (Fig. 13). The work is challenging not only because the tools for digging are limited (only hammers and iron sticks), but also because the bedrock under the wadi is thick and hard. Normally, it takes 2-3 months to dig a well. Despite these difficulties, well digging has become a booming business in Korr in recent years (Sun, 2002a).

II. Settlement Composition and Access to Livestock Products

1. *Composition of Settlement*

In the year 2000, the Tupcha clan had three settlements, two in Korr and one in Kargi. The total population of the three settlements was 759, including 86 (11%) people from other clans who had settled in the Tupcha settlements. According to Sato's observation in 1976, the Tupcha clan had five settlements, inhabited by 386 people, with 46 (12%) people coming from other clans. Although the total population of the clan had grown two times in the last 24

years, the features of the settlement established by the same clan members had remained unchanged.

Population growth is typical among East African pastoral societies, and the reasons for this increase have been explored by studies that have looked both outside and inside the societies. Influences from outside these societies that drive population growth are relatively clear, and include the sedentarization of settlements, the improvement of medical facilities and sanitation, and the decrease in infant mortality through vaccination (Fratkin, 1998). By contrast, influences from inside these societies remain indistinct. For example, although the Rendille's age system affects population control by delaying the age of marriage for men and women (Sato, 1980), young men in the warriorhood group tend to marry earlier than the period designated by the age system. Additional data collection and analysis are needed to explain how this factor influences population growth.

The two Tupcha settlements in Korr are separated from each other by sub-clanship (the Orbola and the Dele). The names of the two settlements are commonly known by the names of the leading lineages in the sub-clan. The settlement built by members of the Orbola sub-clan is called the Galale settlement, and the settlement built by members of the Dele sub-clan is called the Luhmorogo settlement. During the fieldwork period, I stayed in the Galale settlement and spent most of my time with the people there.

The sketch map of the Galale settlement is shown in Fig. 14. In the center of the settlement there is a small circle surrounded by fences constructed from

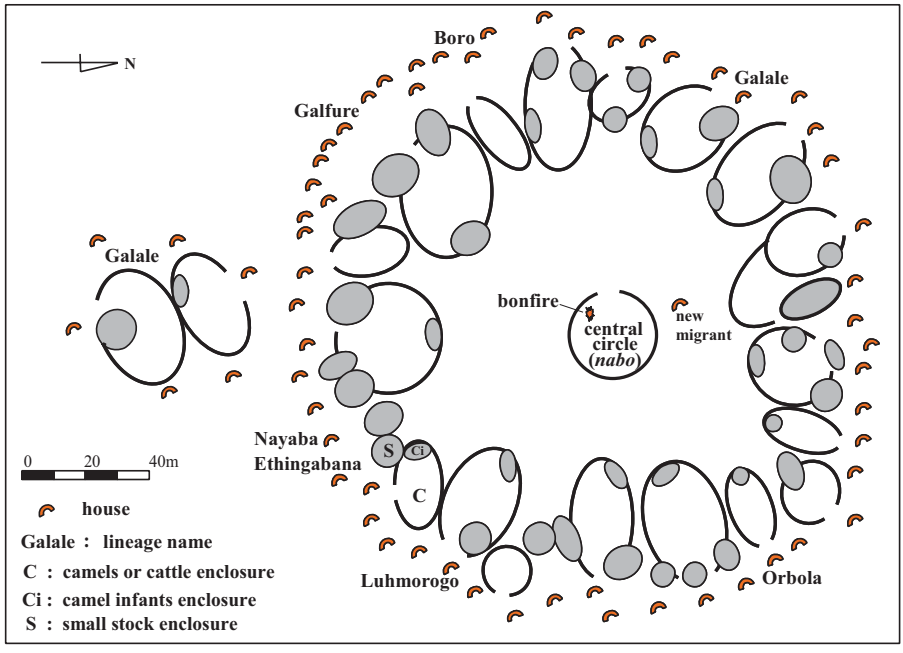


Fig. 14. The sketch map of the Galale settlement.

the twigs of thorn trees. This circle is called the *nabo*, and is used for meetings and ritual ceremonies, as well as for welcoming guests. Married men gather at the *nabo* every night for the evening prayer (*ololo*). Except for some special ceremonies, females and unmarried men are prohibited from entering the circle. The *nabo* serves as the political and ritual center of the Rendille settlement. Surrounding the *nabo* are enclosures for livestock (*sum*), which are separated into camel enclosures and small stock enclosures, with fences built from the branches of thorn trees. Outside of these enclosures and across from the *nabo* are houses built in a rough circle. According to Sato's reports, circular fences were once built outside the houses to guard against carnivores and marauders. However, such fences are seldom built today, since settlements now tend to exist near the towns where large branches of thorn trees are scarce. With the exception of the outer fences, the settlement construction is the same as it was in the 1970s.

In 2000, the population of the Galale settlement was 282, including 177 (63%) living in the settlement and 96 (34%) living in herding camps (Table 2). Of 39 married men, 22 (56%) lived in the settlement, 10 (25%) lived in small stock herding camps, and 2 (5%) lived in camel and cattle camps. By contrast, among the total 60 married women, 57 (95%) lived in the settlement. There were 16 young men in the warriorhood age group, 15 (94%) of whom were in charge of livestock herding camps. Boys and girls older than 7 years are

Table 2. Population composition and residential pattern of the Galale settlement and herding camps (June 2000).

	Settlement	Herding camps			Others[3]	Total
		Camel	Cattle	Small stock		
Male						
married	22	1	1	10	5	39
	(56%)	(3%)	(3%)	(25%)	(13%)	(100%)
warriors[1]	0	8	3	4	1	16
	(0%)	(50%)	(19%)	(25%)	(6%)	(100%)
young boys[2]	15	12	5	14	0	46
	(33%)	(26%)	(11%)	(30%)	(0%)	(100%)
infants (boy)	40	0	2	1	1	44
	(91%)	(0%)	(5%)	(2%)	(2%)	(100%)
Female						
married	57	0	0	2	1	60
	(95%)	(0%)	(0%)	(3%)	(2%)	(100%)
young girls[2]	17	0	0	32	1	50
	(34%)	(0%)	(0%)	(64%)	(2%)	(100%)
infants (girl)	26	0	0	1	0	27
	(96%)	(0%)	(0%)	(4%)	(0%)	(100%)
Total	177	21	11	64	9	282
	(63%)	(7%)	(4%)	(23%)	(3%)	(100%)

1: Warriors are unmarried young men who have passed the circumcision ceremony.
2: Young boys and young girls are over 7 years old, infants are under 7 years old.
3: "Others" are people who belonged to Galale settlement but were travelling to other places during research period.

distinguished as young boys/girls, and those under 7 years old are known as infants (boys or girls). Thirty-one young boys (67%) and 32 young girls (64%) lived in herding camps, and 66 infants (93% of all children both male and female) lived in the settlement. Therefore, the dual-residential pattern of settlement and livestock herding camps suggested by Sato (1980) still remains, along with sex, age, and marriage distinctions.

Table 3 shows the household composition of the Galale settlement. In this paper, a household is defined as one married man with his wife (or wives) and unmarried children. The Galale settlement consisted of 57 households in 2000, including one household whose head was still in his warriorhood (Irmori). In the settlement, 21 households belonged to the Ikololo age-set, 19 belonged to the Ikichili age-set, and five belonged to the Irikimaniki age-set. Although there were 11 households that belonged to the Irmauri and Ikileku age-sets, only one male head of household was alive; the other 10 households were widows' households. In conclusion, the average number of members per household in each age-set (as indicated above) were 4.6, 6.6, 4.2, 3.4, and 2.0 persons (except the warriorhood household), and the overall average number of members per household for the settlement was 4.9 people.

Since boys and girls older than 7 years begin to take care of animals and do so until they marry, unmarried people older than 7 years can be considered "contributors" to the subsistence of the Rendille society (Fig. 15). In the Galale settlement, the number of contributors per household varies among the age-sets in each household. The household in which the head of the household fell into the Ikololo age-set had an average of 0.6 contributors. Those in the Ikichili age-set had 3.7 contributors, the Irikimaniki age-set had 1.6, the Irmauri age-set had 2.1, and the Ikileku age-set had 1.0.

Table 3. Household composition of the Galale settlement by married men's age-sets (June 2000).

Married men's age-set (year of circumcision)	Household numbers	Population	Members per household	Population of "contributor" [2]	Contributor per household
Elderhood					
Ikileku (1923)	2 〈2〉	4	2.0	2	1.0
Irmauri (1937)	9 〈8〉	31	3.4	19	2.1
Irikimaniki (1951)	5 〈2〉	21	4.2	8	1.6
Ikichili (1965)	19 〈4〉	126	6.6	71	3.7
Ikololo (1979)	21 〈1〉	97	4.6	12	0.6
Warriorhood					
Irmori (1993)	1 〈0〉	3	3.0	0	0
Total	57 〈17〉 [1]	282	4.9	112	2.0

1: The number in the 〈 〉 shows the numbers of married men who had died.
2: "Contributor" is identified as unmarried people over 7 years of age.

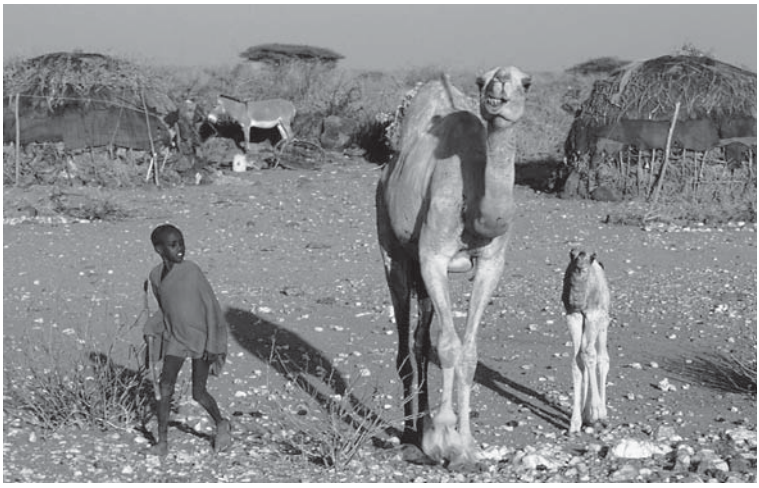


Fig. 15. A small boy looking after mother-infant camels near the settlement.

This variation might result from age systems controlling the marriage period. According to the Rendille age system, men belonging to the Ikololo age-set married between 1990 and 1993; thus, their oldest child would be approximately 10 years old in 2000. In contrast, the household heads from the Ikichili age-set, who married between 1976 and 1979, have many unmarried children older than 7 years. Irikimaniki households, whose heads married between 1962 and 1965, also have many children older than 7 years. However, most of these Irikimaniki elders' daughters had married, which caused the decline in the average number of contributors per household, from Ikichili's 3.7 people to Irkimaniki's 1.6 people.

Age systems have been shown to influence the development cycles of households. As Sato (1980: 68) has pointed out, "this social institution, the age-system, and late marriage, accounts for the slow population growth of the Rendille." However, the regulation of men's marriage period by the age system has become more flexible in recent times. According to the age system, young men belonging to the Irmori warriorhood were not allowed to marry before the *nabo* ceremony (also called *gaal chile*) held in September 2003. But my observation in 2002 showed that 35 (71%) of a total of 49 warriors of the Tupcha clan had married before that ceremony. Thus, it seems reasonable to assume that Irmori warriors may have babies born earlier than would be expected from the age-system's regulation on marriage. The impact of this change is not yet clear and additional data are needed.

In Rendille society, a man's success is often judged by how many wives and children he has, as well as by how much livestock he owns. However, in order to marry, men are supposed to pay eight camels (four males and four females) to his fiancée's family as bridewealth. Though the Rendille are thought to have more camels than the neighboring pastoralist groups, it takes time to accumulate eight camels, owing to camel's low reproductive rate. Of the 39 married men

of the Galale settlement, only three men have more than one wife, and the polygamy rate is about 1.08.

2. *Access to Livestock Products*

As previously indicated, the most significant change in Rendille society during the last two decades has been settlement near towns. Although the dual-residential pattern has remained, people in settlements no longer move a long distance to join the herding camps. On the other hand, since the livestock are mainly kept in herding camps that move frequently for pasture and water, I looked into how the people living in settlements access livestock products, of which milk is the most important. The following are descriptions of the contacts between the Galale settlement and its livestock herding camps with respect to people's access to milk.

The first observation period was from August to December 1999, and included a long dry season (August-November) and a short rainy season (December). During the dry season, camel herds returned to the settlement two times and stayed for a total of 10 days. They returned in order to attend the traditional sacrificial ceremony, the *sorio.* Camels were milked twice a day, early in the morning and again in the evening (Fig. 16), and were taken to pasture in the daytime. Since pastures around the settlement were rare during the dry season, the camels had to walk a long distance each day. Compared with an average of 10 km per day for camp-based herding, the average distance of settlement-based herding was 29 km per day. Though camels are considered the strongest of the Rendille's livestock, this distance is still too long for both camels and herders. No matter how much the people wanted to keep the camels at the settlements, the herds stayed for only five days each time and then left for the camps. The short rainy season came in December, but brought little

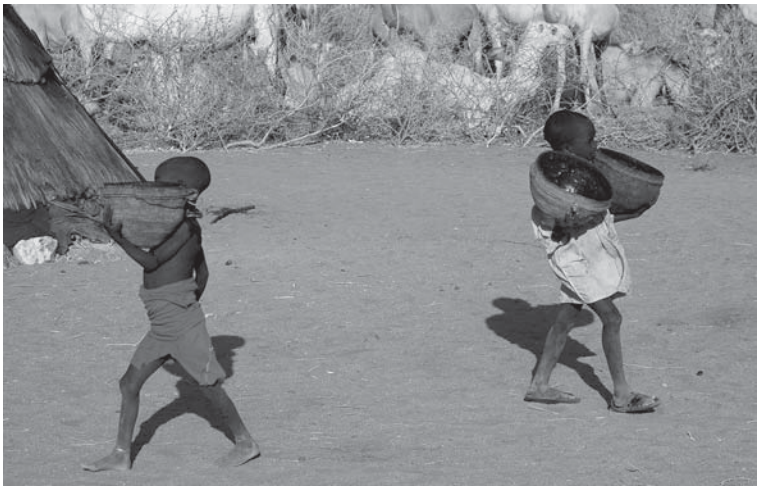


Fig. 16. Small boys and girls carrying milk containers (*uruub*) between houses and camel enclosures at the settlement.

rainfall to the central lowlands where settlement was located. Instead of moving back to the settlement, the camel herds moved to the lava region northeast of the settlement. In addition, no cattle herds returned to the settlement during these five months. On the other hand, small stock herders built their camps 10 km away from the settlement during the dry season; they used the wells (Fig. 12) near the settlement for watering animals every 3-4 days. Though small stock herds passed the settlement each time when they came for water, little milk was obtained due to the long dry season. Consequently, the Galale settlement could access milk for only 10 days during the five-months period.

Generally, when camel herds stay at herding camps, some milking camels will be left at the settlement in order to accommodate people's need for milk. This kind of milking camel is called a *gaali moro*. However, since the observation period occurred during an extensive drought that began at the end of 1998, the scarcity of plants around the settlement led to less contact between the settlement and the herding camps.

The second observation period occurred between May and July 2000. In Rendille land, this is usually a transition period from the long rainy season to the long dry season. However, the drought continued and no rain fell during the long rainy season. This severe situation forced the Galale's cattle and small stock herds to move to the surrounding mountain regions of the Rendille land. Only camel herds still stayed in the central lowlands. During this period, the Galale's camel herds stayed at a place 20 km north of the settlement, and no milking camels were left at the settlement. Nonetheless, camel herds returned for water every 10 days, and each time they stayed at the settlement for 2-3 days. At other times, camels traveled several days to the Koralle Spring for water during the dry season, but since the observation period corresponded to the camels' delivery season, many newborn infants had no alternative but to stay at the camp. Owning to the infant camels' incapacity to move a long distance and inability to leave their mothers for several days, the destination of the adult camel herds traveling for water was changed from the Spring to the wells either near Korr town or near the Tupcha settlements. Though the drought continued and the situation became more severe than in 1999, people living in the settlement were able to get milk from the camels for 2-3 days every 10 days. This was valuable in preventing malnutrition among the people in the settlement during the long dry season.

Both the third observation period (December 2001 - January 2002) and the fourth observation period (December 2002 - March 2003) consisted of a short rainy season and a short dry season. Since rainfall was relatively abundant during these two periods, plants grew and covered the ground where the Galale settlement was located. Each household had either milking camels or milking cattle, and some households even kept several small stock animals for milking and slaughtering. A traditional *armado* ceremony was held during each period, and all the small stock herds that belonged to the settlement came back for this ceremony (Fig. 17). During both periods, milk for daily consumption was abundant.

Fig. 17. All small stock herds moving around the settlement before sunset during *armado* ceremony.

In conclusion, many factors influence the access to livestock products in settlement, include seasonal changes, plant growth around settlements, and ritual ceremonies. Compared with the seasonal fission and fusion pattern of settlements and camps 20 years ago (Sato, 1980), it is clear that people today have less access to livestock products. However, that does not mean that people in settlements have abandoned their efforts to obtain livestock products. Instead, as they did in 2000, people create opportunities to obtain milk during the long dry season by re-arranging their camels' watering places and schedules.

III. Cooperative Relationships as Part of Livestock Management

The Rendille separate their livestock by species into different herds. Normally, managing a camel or cattle herd requires two people, a young boy for the day's herding, and a warrior for management. One herder, usually a married man or an unmarried girl, can manage small stock herds. Theoretically, if one household wants to manage three species of livestock by itself, at least five laborers are needed. However, as previously mentioned, the average size of a typical Rendille household is 4.9 people, which includes only two laborers. Consequently, cooperative herding is inevitable for livestock management.

In Rendille society, cooperative relationships are found on both social and personal levels. The settlement, which is formed mainly by clanship, is regarded as the largest cooperative unit. For example, if someone becomes ill or gives birth and needs nutritional food such as milk, his or her family members ask other households in the settlement for help. No household would refuse such a request. In addition, individuals form cooperative relationships among themselves.

The most representative cooperative relationship, with respect to livestock

management, among Rendille households has been defined as the "subsistence unit" (Sato, 1980: 45):

> A cooperative management group for camels includes several stable livestock-holding units in terms of customary law. They form themselves into a stable economic unit in order to be self-sufficient in the recruitment of herders and the maintenance of herds of effective breeding size.... There is almost no intensive cooperation in the management of small stock among the groups which subsist on different camel herds. For these reasons, I have distinguished the cooperative management group for camels as the subsistence unit of the Rendille.

Though the subsistence unit is formed to manage camel herds, the unit's members also practice cooperation in their daily lives. That is, people belonging to the same subsistence unit build their houses near each other, and build one enclosure for all the members' camels. Also, food distribution among the members is common.

In 2000, 10 subsistence units were formed to manage 10 herds of camels of the Galale settlement. Table 4 shows the number of households per subsistence unit, the numbers of camels per unit and the relationships among households in the same unit. The average number of households per subsistence unit is 5.3, and the average number of camels per herd (belonging to one unit) is 48.9. The relationships of the heads of households within the same subsistence unit are divided into four categories: (1) close agnatic relationships, which include independent elders, independent warriors, full brothers, half-brothers, paternal uncles or nephews, paternal cousins, (2) agnatic relationships, excluding close agnates, which include members of the same lineage group or the same sub-clan, (3) affinal relationships, which include sons-in-law and brothers-in-law, and (4) the individual.[4] Within the 10 subsistence units of the Galale settlement, three units (30%) with a total of 12 households were formed by close agnatic relationships, four units (40%) totaling 24 households were formed by agnatic relationships, excluding close agnates, and two units (20%) of 16 households were formed by affinal relationships. Only one household had its own camel herd and was counted as one unit (10%).

According to Sato's data (1980: 44), there were 25 subsistence units in the entire Tupcha clan. The detailed relationships among theses units included 11 units (44%) of close agnatic relationships, 12 units (48%) of agnatic relationships, excluding close agnates, and 2 units (8%) of affinal relationships. By a comparison with data from 2000, we can say that it is clanship (including both close agnatic relationships and agnatic relationships excluding close agnates) that serves as the principal foundation for the formation of subsistence units.

Next, I examined how the subsistence unit organizes labor for herding. Of the two laborers who are needed to care for a camel herd, one acts as a manager and supervises the selection of pasture area, the building of camps, and the maintenance of security, while another does the work of herding the

Table 4. Composition of "subsistence unit" and number of camels.

Name and relationship among subsistence unit	No. of households	No. of camels	No. of Subsistence unit 2000	1976 [4]
close agnatic relationshiops [1]				
GO	5	57		
SL	4	48		
GE	3	51		
sub-total:	12 (23%)	156 (32%)	3 (30%)	11 (44%)
agnatic ralationships except for close agnates [2]				
SH	7	49		
GL	7	53		
GU	6	43		
YG	4	33		
sub-total:	24 (45%)	178 (36%)	4 (40%)	12 (48%)
affinal ralationships [3]				
SG	9	69		
GG	7	53		
sub-total:	16 (30%)	123 (25%)	2 (20%)	2 (8%)
individual				
NE	1	33		
sub-total:	1 (2%)	33 (7%)	1 (10%)	0
Total:	53 (100%)	489 (100%)	10 (100%)	25 (100%)
Average	5.3	48.9		

1: independent elder; independent warrior; full-brother; half-brother; paternal uncle-nephew; paternal cousin
2: same lineage group; same sub-clan
3: son-in-law; brother-in-law
[the above classification is referred to Sato (1980: 44)]
4: Sato (1980: 44)

Table. 5. Number of herd managers and herders, and their relationships to herd owners.

Herd name	Number of herd owners	Managers (warrior)	Relationship between herds owners and manager	Herders (young boy)	Relationship between herds owners and herder
GO	5	1	full-brother[1]	1	employee (same clan) [3]
SL	4	0	—	2	father-son [2]
GE	3	0	—	1	father-son
SH	7	1	full-brother	1	father-son
GL	7	1	full-brother	1	employee (same clan)
GU	6	1	full-brother	1	employee (same clan)
YG	4	1	full-brother	1	employee (same clan)
SG	9	1	full-brother	1	employee (same clan)
GG	7	1	full-brother	1	father-son
NE	1	0	—	1	father-son

1: the manager of the herd is at least one of herd owners' full-brother.
2: the herder of the herd is at least one of herd owners' son.
3: the herder of the herd is hired by herd owners, and both belong to the same clan.

animals during the day. Table 5 shows the relationships between herd owners (heads of households in the same subsistence unit) and herd managers, and the relationships between herd owners and herders. Among the 10 camel herds of the Galale settlement, seven (70%) had managers who were warriors, and all of them were full brothers of at least one of the herd owners. In addition, each herd employed at least one young boy for the day's herding, but the relationship between herd owners and herders was not simple. That is, five people (50%) cared for herds to which their fathers' camels belonged, while the other five (50%) worked as employees.

In East African pastoral societies, young boys and girls are often employed as herders. In households with many children but few livestock animals, working as employee herders is a way for children to acquire their own animals. In Rendille camel camps, one heifer camel is given to an employee herder as a reward for two years of work. As shown in Table 5, when the herd owners need new herders, they prefer young boys who belong to the same clan. In addition to the subsistence unit, other cooperative relationships for livestock management are practiced, and these are described in later sections.

IV. Herding and Management of Camels

A camel herd consists of camels from different households in the same subsistence unit; usually two people, a warrior and a young boy, are in charge of each herd. The general work of managing camels includes looking for pasture areas, building camps, herding, milking, taking the camels to water resources, and protecting the camels from carnivores and marauders. Obviously, instead of pasturing a herd alone, joining other camel herds and setting up a herding camp together may improve both work efficiency and environmental security. The Rendille often prefer to bring all herds of the same clan or sub-clan together in order to build one large camp, which is usually named after the clan. A detailed description of current camel herd management follows.

1. *Composition of Camel Herds and the Population Dynamics of Camels*

The Rendille distinguish their camels by age and sex. The age groups are infancy, juvenility, adolescence, and adulthood. Male adult and adolescent camels are defined as stud camels (*oul*), castrated camels (*duffan* or *folas*), and pack camels (*hal*), while female adult and adolescent camels (*aito*) are characterized as pregnant camels (*aiti-rimei*), camels that have just given birth (*aiti-irbaan*), and others (*aiti-rimeilah*). In addition, juvenile camels (*teeru*) are distinguished as male (*khalim*) and female (*khalim-deiyah*), and infants (*nioloho*) are distinguished as male (*nioloho-ki-labo*) and female (*nioloho-ki-deiyah*).

Table 6 shows the age-sex composition of the Tupcha clan's camel herds in July 2000. At that time, the clan had 32 camel herds, of which 22 belonged to the two settlements located in the Korr region. During the period of this study's fieldwork, 21 of the herds were observed. There was a total of 1,054 camels in these 21 herds, including 27 stud camels (2.6%), 209 other adult and

Table 6. Age-sex composition of the Tupcha clan's camel herds (July 2000).

Herd No.	Adult-adolescent male		Adult female	Juvenile	Infant		Total
	Stud camel	Other male			Male	Female	
1	2	13	43	20	8	2	88
2	1	12	31	14	4	7	69
3	1	20	26	16	2	4	69
4	2	22	21	16	2	5	68
5	1	9	23	15	7	2	57
6	0	6	27	15	0	5	53
7	3	10	22	12	2	4	53
8	1	16	23	6	2	4	52
9	1	4	19	23	3	1	51
10	1	8	29	5	1	6	50
11	1	14	20	10	2	2	49
12	2	13	19	6	2	6	48
13	2	12	17	13	1	3	48
14	1	7	24	12	1	2	47
15	1	13	23	5	1	2	45
16	1	5	24	10	3	1	44
17	2	8	21	7	1	4	43
18	1	4	15	9	2	2	33
19	1	4	16	9	1	2	33
20	0	6	18	8	1	0	33
21	1	3	10	4	1	1	20
Total	27	209	471	235	47	65	1054
(%)	(2.6%)	(19.8%)	(44.7%)	(22.3%)	(4.4%)	(6.2%)	(100%)
Average	1.3	10.0	22.4	11.2	2.2	3.1	50.2

adolescent males (19.8%), 471 adult and adolescent female camels (44.7%), 235 juvenile camels (22.3%), 47 male infants (4.4%) and 65 female infants (6.2%). The average number of camels per herd was 50.2, with an average of 22.4 adult and adolescent female camels (44.7%). Since the adult female animal is recognized as the basis of self-sufficiency in the pastoral economy, due to its ability to supply milk and its reproductive capabilities, the high percentage of female camels among the Tupcha's herd showed that people were maintaining their livestock-based livelihood.

According to Sato's observations in 1976 (Sato, 1980), the Tupcha clan had 26 camel herds, and the average number per herd was 49.1 camels. Compared with data from 2000, the size (population) of the herd was almost the same, but the total number of herds for the clan had increased 1.23 times (from 26 herds to 32 herds). However, since the clan population had grown from 386 people in 1976 to 759 people (1.97 times) in 2000, the average number of camels per person actually decreased from 3.3 to 2.1. In addition, since the average population per household was 4.9 people both in 1976 and 2000 (see Table 3), the estimated number of camels per household was 16.2 camels in 1976 and 10.3 camels in 2000. Therefore, although the total number of camels

did increase over time, both the average number of camels per household and the average number of camels per person decreased because the human population grew faster than that of the camels.

In the arid area of East Africa, livestock numbers fluctuate greatly, due to unpredictable environmental change. According to Ellis and Swift's (1988) analysis of the interaction between drought and livestock in Turkana land, a single-year drought leads to a modest decline in livestock numbers, whereas a multi-year drought not only causes significant livestock loss but also takes several years for the livestock population to fully recover. Consequently, I cannot hypothesize that the number of the Tupcha's camels has grown during the last 24 years, although the total number in 2000 was higher than in 1976. Instead, it seems reasonable to suppose that the maintenance of the camel population demonstrates the Tupcha's ability to recover their livestock after damage caused by environmental change.

2. *Construction of Herding Camps and the Formation of Daily Herding Groups*

Fig. 18 shows the sketch maps of the herding camps where the Tupcha's 21-22 herds settled in 1999-2000. Type-A was a camp built between September and December 1999. During this period, camel herds moved several times, and a total of six Type-A camps were set up.

When camel herds arrive at the place where a camp is to be established, all of the warriors stab their spears into the ground at the same place, and this spot becomes the communal space (*kulal*) of the camp (Fig. 19). First, an enclosure for the juvenile and infant camels from all the herds (*sum-ki-nioloho*) is built from branches of thorn trees on the east side of the communal space. Then the people build a large enclosure (*sum*) of more than 2 m high that surrounds the entire campsite (*raas*). Finally, small fences, less than 1 m high, are built between the surrounding enclosure and the infants' enclosure in order to separate the different herds. Thus, each herd has space for adults and adolescents between the surrounding enclosure and the infant enclosure. When building the surrounding enclosure, entrances (*arit*) are built in different directions. Each herd has its own entrance so that the animals can be taken to different sides of the camp for the day's herding. The communal place is used for distributing daily food and for meeting guests. In addition, the warriors sleep there at night. Some private spaces (*hojop*) are built for young boys within the area occupied by the adult and adolescent camels. Since the camel camp is quite large, it usually takes a whole day to build one.

Basically, only one communal place is built in each camel camp. However, Fig. 18 indicates that two communal places were built in the Type-A camp. This occurred because the camp housed camel herds from two settlements of the Tupcha clan, and the warriors from each settlement decided to build their own communal place. The circumference of the Type-A style camp was about 360 m, while the Type-B camp was smaller. This camp was built between May and July 2000, which corresponds to the camels delivery season. During this period, a large Type-A camp was divided into three Type-B camps, and a

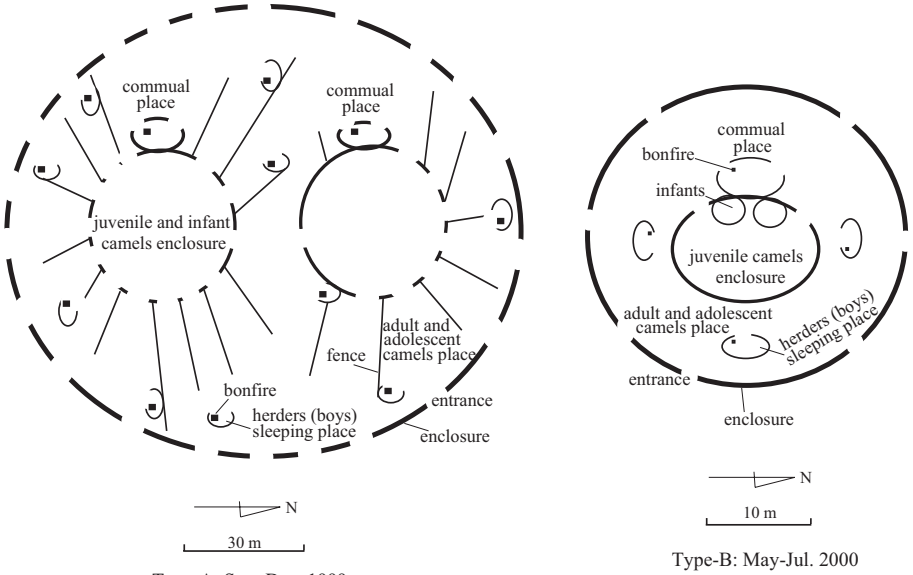


Fig. 18. The sketch maps of camel herding camps.

Fig. 19. The position of the communal space (*kulal*) of a new camel campsite is shown by warriors' spears stabbed at a same place.

total of 21 herds in the Type-A camp were divided into five, seven, and nine herds among three Type-B camps. The primary difference in the construction of Type-A and Type-B camps is that the latter does not have fences between the surrounding enclosure and the juvenile camels' enclosure. Nonetheless, small enclosures are built for newborn infant camels inside the juvenile enclosure.

This change in camp construction relates to the camel's delivery seasons. In

Rendille land, camel conception and pregnancy are viewed as closely related to the nutritious fresh herbs regenerated during the rainy seasons. The camel's gestation period lasts for 12-13 months, and the regular delivery season for camels in Rendille land would usually be at the end of rainy seasons or at the beginning of dry seasons, that is, the periods from April to June and from December to February. Between May and June 2000, 72 newborn infants (28 males, 39 females, 5 dead) were confirmed within the Tupcha's 21 herds. The Rendille do not give infant animals water for about 1-3 months because they believe water is not good for the infant animal's health and growth. However, other camels must be watered every two weeks during the dry season. Since newborn animals cannot walk far distances, they remain at the campsite when the adult and adolescent camels go for water. In June 2000, the Tupcha's camel herds were watered at wells near Korr town. Watering animals at wells is regarded as a difficult task that normally requires three men to pull the water buckets up from the well. As all members of camel camps are supposed to work at the well, nobody can be left at the campsite to care for the newborn animals. In order to solve this problem, three Type-B camps were built, each of which was located within a distance less than one kilometer from one another. In addition, the people designed an efficient schedule for watering the animals. That is, people in different camps arranged to go for water on different days, and newborn animals from one camp were sent to other camps when their adult and adolescent groups went for water. Furthermore, camel herds passed by the settlement on their way to the wells and brought milk to people in the settlement during that time. This arrangement demonstrated the Rendille's skillful management of camel herding.

As previously mentioned, entrances are built for each herd in different sections of the camp's surrounding enclosure, in order to avoid crowding when different herds leave the camp in the morning and return in the evening. In Rendille land, the sun rises at approximately 6:20 a.m. and sets at

Fig. 20. A warrior driving camel herds out of the camp for day's herding.

approximately 6:40 p.m. Since the temperature varies widely between daytime and nighttime, the temperature is relatively low in the early morning. Camel herds are not taken out for pasture until the ground gets warm by about 9 a.m. Young boys are in charge of day's herding, and warriors assist them in driving the camels out of the camp (Fig. 20).

Basically, one herd is divided into two groups. Adult and adolescent camels as well as juvenile camels that have been weaned from their mothers form one herding group, while infants stay near the campsite. This separation prevents mother camels from feeding their infants during the day's herding. In some cases, infants from 2-3 herds are brought together and looked after by a small boy near the campsite. Sato (1980) reported this formation of herding groups, which is referred to in this paper as "infant-separated herding," and illustrated on the left side of Fig. 21.

However, a different formation of herding groups was observed in 1999. As illustrated on the right side of Fig. 21, each camel herd is separated into an adult/adolescent/juvenile group and an infant group. Following this, the two herds exchange their infant groups and become another two new herds, each of which includes both their originally-owned adult/adolescent/juvenile group and an infant group of other herd. This newly formed herd is taken out to pasture as one herding group. This formation is known as "infant-exchanged herding" in this paper.

The difference between these two types of herding groups is that, in the infant separated herding, the two herds are separated into three herding groups and three laborers are required to look after them, whereas in infant-exchanged herding, two herds are separated and reorganized into two new groups so that

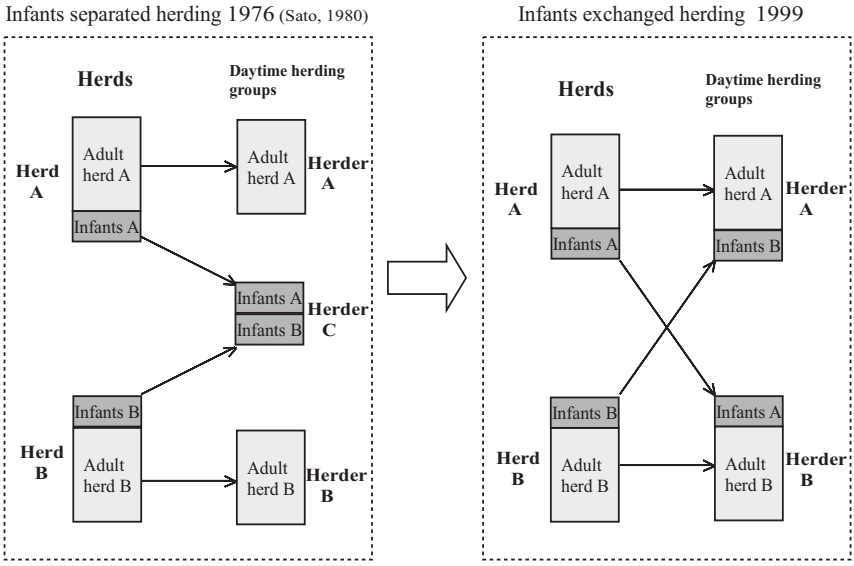


Fig. 21. Change of the formation of the day's herding groups.

two laborers are enough to care for them. This reorganization is based on the fact that mother camels refuse to feed any infants except their own. However, the problem with infant-exchanged herding is that the range of pasture area for the whole herding group is limited because infant camels cannot travel as far as adults can, and the herder must control the adult camels' movements.

In fact, infant-exchanged herding has not been previously reported. Warriors in the herding camp explained that this method had been developed to deal with a temporary shortage of herders, a shortage that is due to several factors. First, more Rendille are raising cattle, which has led to increased labor demands. Second, after the sedentarization of the settlements near towns, more young boys and girls have begun to go to school. This new formation of herding groups illustrates the Rendille's ability to develop new herding and management skills.

3. *Population Structure and Dietary Patterns in Camel Camps*

Between September and December 1999, the Tupcha's camel herds settled in six different places (all of them are Type-A). The population structures of five camps (B, C, D, F1, F2) are shown in Table 7.

At first, camp B consisted of 21 camel herds. When these herds moved and set up camp C, one herd joined the camp for a total of 22 herds. These 22 herds moved together again and built camp D. The total population of the three camps was 36, 43, and 40 people, respectively, and the average population per herd was 1.8. On the other hand, camp F1 and F2 used the same campsite. A total of 21 herds built the F1 camp and were joined by one more herd to form F2. The population of F1 was 64 people, while F2 was 67 people. The average population per herd was 3.1. More than 90% of the people in each camp were warriors and young boys.

Camps B, C, and D were built in central lowlands. This area has semi-desert grassland vegetation between September and November, during the long-dry season. Camps F1 and F2 were built in the lava region, which has bush-thicket and grassland vegetation in December during a short rainy season. During the

Table 7. Seasonal change of population structure in the Tupcha clan's camel camps.

	Dry season								Rainy season								Total
	Camp B (30 Sep.-10 Oct.)		Camp C (25 Oct.-30 Oct.)		Camp D (5 Nov.-16 Nov.)		sub-total		Camp F1 [2] (5 Dec.-12 Dec.)		Camp F2 [2] (13 Dec.-25 Dec.)		sub-total			
elder	2	(6)	2	(5)	1	(3)	5	(4)	3	(4)	3	(4)	6	(4)	11	(4)
warrior	10	(28)	14	(32)	13	(33)	37	(31)	12	(19)	14	(21)	26	(20)	63	(25)
young boy	24	(66)	27	(63)	26 [2] [1]	(64)	77	(65)	49 [28] [1]	(77)	50 [28] [1]	(75)	99	(76)	176	(71)
Total	36	(100%)	43	(100%)	40	(100%)	119	(100%)	64	(100%)	67	(100%)	131	(100%)	250	(100%)
No. of herds	21		22		22		65		21		22		43		108	
Average (human/herds)	1.7		2.0		1.8		1.8		3.1		3.1		3.1		2.3	

1: The number in the [ ] shows numbers of infant boys who are not engaged in herding works, girls are prohibited from staying at camel camps.
2: Camp F1 and F2 were set up at the same place.

long dry season, the volume of milk from the camels is low, and they need water every 10-14 days. Only the manager and the herder can remain in the camp and, in some cases, only one warrior or one young boy stays with their herd at camp during this period. By contrast, milk production is abundant during the rainy seasons, and camels do not need to travel long distances for water, so many people can live together in the camps and rely on livestock for sustenance. The fluctuation of the average population per herd, from 1.8 people in the dry-season camp to 3.1 in the rainy-season camp, demonstrates how humans move in order to have access to livestock products. Among the 50 boys in camp F2, 28 (56%) were under 7 years of age, and they came to the camp for milk and just stayed there because they were too young to work as herders.

According to Sato (1980), the population per herd in 1976 changed from 1.6 in the dry-season camp to 2.6 people in the rainy-season camp (1.6 times that of dry season). In 1999, the population fluctuation rate between the dry and rainy seasons came to 1.7 times (from 1.8 people to 3.1 people). Consequently, the population dynamics of camel herding camps between dry seasons and rainy seasons can be viewed as a continuous adaptive strategy related to the consumption of camel products.

The Rendille do not take any agricultural products into the camel camps, and they are even prohibited from carrying cooking utensils into camps. Except for the camels that die due to disease or accident, they do not eat any meat in the camps. Milk and blood from camels are the main food sources for people living in camel camps. Camels are milked twice a day, normally at 7:00 a.m. and 9:00 p.m. In dry seasons, if there is not enough milk for all the people in the camp, blood will be collected too, and thus a mixture of milk and blood called *banjo* will be made (Figs. 22, 23). The camels chosen for donating blood are adult and adolescent camels, excluding the stud and pregnant animals, and a different camel is chosen each time. Every morning and evening, the blood and the milk from all the herds is brought to the communal place in the camp in large milk containers (*uruub*). Small boys who cannot drink blood receive milk alone. One warrior makes and distributes the mixture of milk and blood to the rest of the people living in the camp, including guests. Although a warrior and a young boy may recieve different quantity of food, all warriors receive the same amount, as do all young boys. Everyone in the camp has his own milk container (*sorol*), and the milk or *banjo* is distributed from the *uruub* to each *sorol* (Fig. 24).

Table 8 shows the distribution and consumption of milk and blood in Tupcha's camel camp. During dry seasons, a boy younger than 10 years takes 2,639 ml of milk per day, from which he can gain 1,847 Kcal and 98 g of protein. A boy aged 15 years takes 2,138 ml of *banjo* per day, which supplies 1,338 Kcal and 96 g of protein. A warrior takes 3,840 ml of *banjo* per day, for a total of 2,404 Kcal and 172 g of protein. By comparison, all people living in camel camps can consume whole milk during rainy seasons. A boy younger than 10 years old takes 3,121 ml milk per day, from which he can

Fig. 22. Camel blood is removed by cutting the jugular vein with a bow and arrow.

Fig. 23. *Banjo* is made by mixing milk and blood together.

Fig. 24. Food is distributed and put into everyone's milk container at the communal place of a camel camp.

Table 8. Average food yield and distribution in the Tupcha clan's camel herding camp.

	Dry season			Rainy season		
	Food (ml/day)	Average calories[3] (Kcal/day)	Average protein[3] (g/day)	Food (ml/day)	Average calories (Kcal/day)	Average protein (g/day)
Small boy [1]	2639 (m)	1847	98	3121 (m)	2185	115
Young boy [2]	2138 (mb)	1338	96	3840 (m)	2688	142
Warrior	3840 (mb)	2404	172	3840 (m)	2688	142

(m: milk), (mb: mixture of milk and blood)

1: Small boy is under 10 years of age.

2: Young boy is about 15 years of age.

3: Sato (1984)

	calories	protein		calories	protein
milk	70Kcal/100g	3.7g/100g	blood	33Kcal/100g	7.6g/100g

gain 2,185 Kcal and 115 g protein, while a 15-year-old young boy and a warrior take 3,840 ml of milk per day, which supplies 2,688 Kcal and 142 g of protein.

According to the FAO and WHO standards, an adult male needs 46 Kcal per 1 kg of body weight and 0.6 g of protein per 1 kg of body weight per day to support average activities. Young boys who are approximately 15 years old need at least 55 Kcal per 1 kg of body weight and 0.78 g of protein per 1 kg of body weight (Kuchikura, 1995). The Rendille's average weight is calculated by the average height minus 110, which is 63 kg for an adult male and 35 kg for young boys (Sato, 1984). According to the FAO's standards, therefore, an adult Rendille male needs 2,890 Kcal and 38 g of protein daily, whereas a young boy needs only 1,932 Kcal and 27 g of protein daily. Compared with the data collected from fieldwork, both warriors and boys consume fewer total calories but three times more protein than average during dry seasons. During the rainy seasons, boys take in more total calories and protein than average, and warriors consume fewer calories but more protein.

As a result, the dietary patterns in the Rendille's camel camp can be characterized as low-calorie but high-protein. A distinctive feature of dietary pattern in the camel camp is the impartial distribution of food at the communal place. Food distribution in camel camps reinforces the solidarity of the camp members, and also removes the distinction of the numbers of milking camels between herds.

4. *Mobility of Camel Herding Camps*

The camel is the most adaptive of the Rendille's livestock, and is well suited to traveling across the semi-desert of Rendille land, owing to its biological capacity. Sato (1980) noted that, during a 136-day observation period in 1976, camel herds spent 84 days (62% of the time) moving to either water points or new campsites, and the remaining 52 days (38%) they stayed at camps and went out to pasture each day. The average movement was 14.5 km per day.

However, as previously mentioned, the changes of Rendille's residential

Fig. 25. Camel herds moving to a new camp.

patterns, especially the current sedentarization of settlements to towns, have impacted both the movement patterns and the mobility of livestock. Since the mobility of livestock is an important adaptive strategy for using unstable natural resources and for escaping from natural hazards, it is important to focus on the current movements of livestock (Fig. 25).

Fig. 26 illustrates the positions and movements of the Tupcha's camel camps that were observed between 1999 and 2003. From September to November 1999, camel camps were set up at four places (A, B, C, D) in the semi-desert

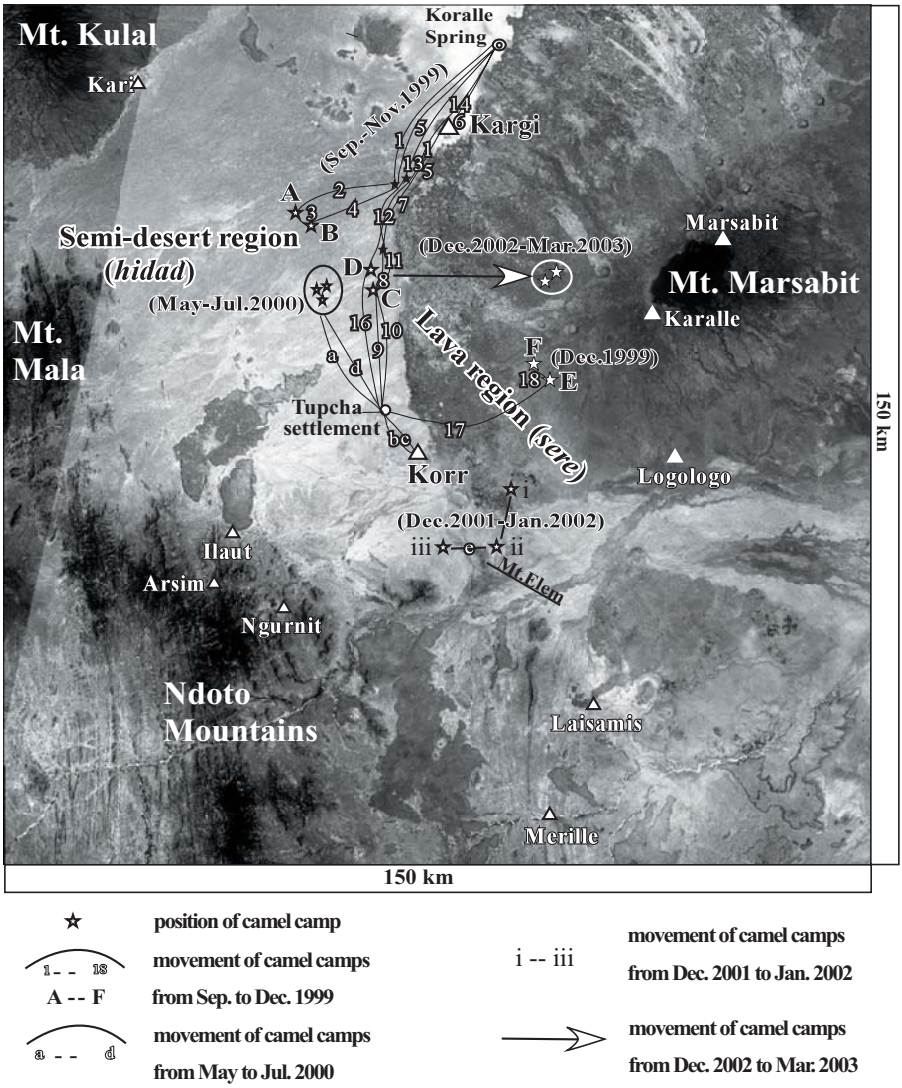


Fig. 26. Movements of the Tupcha clan's camel herding camps.

grassland between Korr and Kargi, and at two temporary camps on the way. Since this time period constituted a long dry season, camel herds were taken to the Koralle Spring for water every 14 days, and all herds moved to a new place and set up a new camp together after being watered. This was considered the basic pattern of camel camp movement. In October and November, the Rendille's traditional sacrificial ceremony, the *sorio,* was held, on two occasions. Since they prefer to bring camels back to the settlement during the ceremony, all herds of the Tupcha's camel camp returned the day before the ceremony. In October and November, camel herds stayed for five days each month at the settlement for the ceremony. In December, the short rainy season arrived. After confirming the rainfall in the lava region northeast of the settlement, all herds moved to that region and camp E was set up. After the short rainy season, they moved again to camp F, in an area covered by dense bush and grasses after the rainy season, and stayed there for almost a month.

Between May and July 2000, the camel camp remained in the semi-desert grassland 20 km northwest of the settlement. This period corresponded with the camels' delivery season, and many newborn camels stayed in the camp. Since these infants could not walk long distances, the camp itself stayed at one place, while the adult-adolescent and juvenile camels travelled between campsites and wells at Korr for water.

The time between December 2001 and January 2002 was a transition period from the short rainy season to the short dry season. During this period, the Tupcha's camel camps settled at the foot of Mt. Elem, 35 km southeast of the settlement (Camp i, ii, iii in Fig. 26). According to the warriors of the camps, the region in which they settled had more rainfall during the short rainy season that year, and the conditions of plant growth were better than in the central lowlands where they had stayed the previous year. However, as compared to the central lowlands, this region is relatively insecure because of its proximity to the main north-south road, by which the Somali or the Boran marauders might arrive. During the period of camp ii, a rumor circulated that the Somali had raided one of the Rendille's camel camps near the main road. When warriors of the Tupcha's camel camp heard this rumor, they soon moved the camp towards the west, far away from the main road.

Between December 2002 and March 2003, the Tupcha's camel camp moved from a semi-desert region to a lava region northeast to the settlement, and stayed nearly two months in the lava region. This period included the short rainy season and the short dry season. Since the short rainy season lasted for quite a long time and rain fell until mid-January, water from the small streams that flow down from Mt. Marsabit remained in the lava area until the end of February. During this time, not only camels, but also cattle and small stock were herded in this region.

In 1999, within a period of 90 days (September 27 - December 25), the Tupcha's camel herds spent 10 days in the settlement for the *sorio* ceremony. Within the remaining 80 days, the herds moved 27 days (34% of the time), either for watering or to travel to a new camp. They stayed 53 days (66%)

in camps and went to pasture daily. The average distance traveled per day was 13.6 km. Compared with the data from 1976 (Sato, 1980), the change of average distance per day was small (from 14.5 km to 13.6 km), but it appears as if the camel herds spent more time in one camp (from 38% to 66% of the time) in recent years, and that the time spent moving the camp to a different place decreased (from 62% to 34%). Even though the reason for this change is not clear, the data mentioned illustrate that the Rendille's camel herds moved frequently over a wider area, as compared to the sedentarization of the settlement today. Furthermore, current movement patterns of the Rendille's camel camps relate to both natural environmental factors, such as the seasonality of water resources, the camel's biological features, such as their delivery seasons, and social factors, such as ceremonies and avoiding raids. Since these factors are not in isolation, but in interaction, knowledge of the natural environment and experiences of movement are important to the camp's mobility. Consequently, the frequent movements illustrated in Fig. 26 suggest that the managers and herders of the Tupcha's camel herds know how to maintain their mobility.

5. *Watering Camels*

In Rendille land, the only permanent surface water source is the Koralle Spring, which is located in the northern boundary of the area. Generally, camels are taken to the Spring for water every 10-14 days during the dry seasons. In some cases, the movement for water may take 2-3 days, and the distances covered by camels may be more than 50 km. Since the Spring is located in the Chalbi desert, which is dry and extremely hot, and without trees,[5] camels arrive at midnight, and stay at the Spring until the following afternoon, so they have time to take water, and can enter the water if the temperature is sufficiently high.

If the camel camps are located far from the Koralle Spring, or when the camel delivery season occurs, wells near Korr are used for watering camels. Except for the pumped wells built by missionaries, most wells near Korr are located on the banks of a large wadi (Fig. 27). This type of well is approximately 1-2 m wide and 4-5 m deep, and can yield 1,500-2,500 liters of water per day.[6] Normally, three men are needed to pull and pass the water buckets up from the well, and another two or three people separate a herd into different small groups and send them to the well. Table 9 shows the pattern of watering camels at a well and the quantity of water that the camels drink. A herd consisting of 33 adult and adolescent camels, three juvenile camels, and six infants was separated into five groups, and took more than two hours to drink water from a well. A total of 2,009 liters of water was consumed by 42 camels, and the average was 47.8 liters per camel.

As previously mentioned, one well can generally supply 1,500-2,500 liters of water per day, so it can only be used for watering one herd (40-50 camels) of camels. If all the herds from one camel camp come for water at once, several wells have to be prepared. The individuals who own the wells can easily water

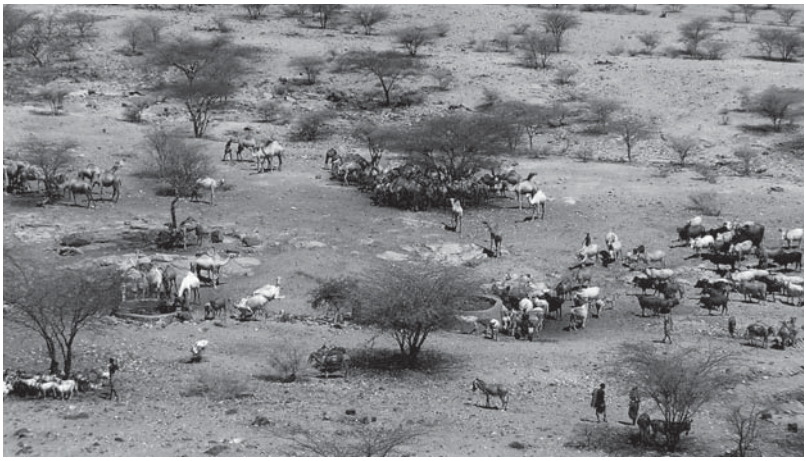


Fig. 27. Wells located on the banks of a large wadi near Korr town.

Table 9. Quantity and pattern of watering a camel herd.

Sub-groups	Number of camels			Total	Quantity [1]	Time
	Adult & Adolescent	Juvenile	Infant		of water (l)	(min)
1	12				623	31
2	9				434	22
3	9				336	15
4		3			217	21
5	3		6		399	38
Total	33	3	6	42	2009	127
Average (l/camel)					47.8	

1: Quantity of water is reckoned by the total amount of water buckets.

their animals, and those who do not have wells negotiate with well owners in order to use the wells. In Rendille language, asking for water for livestock is called *khokudaro,* and is mainly practiced by married men (livestock owners). If a well has water and no herd plans to use it, the owner may not refuse a request for water. In later sections, I analyze how people use wells.

V. Herding and Management of Cattle

The Rendille have been understood as "camel pastoralists" for a long time, and few studies have focused on their cattle herding. According to Fratkin (1993), the average number of cattle held by the Rendille per household was 2.6 in 1989, whereas the neighboring Ariaal had an average of 20.6 cattle per household during the same time. However, in recent years, the Rendille have raised more cattle for both livestock products and markets (Sun, 2004). Detailed descriptions of their current cattle herding and management strategies are presented below.

Table 10. Composition of cattle herds.

Herd Name	Bull and ox		Cow & heifer	Calves		Total	Number of owners	Number per owner
	stud bull	others		male	female			
NL	2	9	39	13	20	83	7	11.9
HE	2	10	49	15	17	93	7	13.3
RG	2	22	52	21	15	112	11	10.2
DL	1	2	14	6	4	27	1	27.0
GG	2	4	25	11	9	51	9	5.7
Total	9	47	179	66	65	366	35	10.5
Average per herd	1.8	9.4	35.8	13.2	13.0	73.2		
(%)	2.5	12.8	48.9	18.0	17.8	100		

1. *Growing Numbers of Cattle*

The Rendille categorize cattle by age and sex. Male cattle are characterized as stud bull (*or*), ox (*her*), adolescent bull (*ilbori*) and male infant (*maro*), while females are defined as cow (*sahao*), heifer (*urhar*), and female infant (*maroto*). In 2003, the two settlements of the Tupcha clan in Korr had a total of 11 herds of cattle, and five of them were observed during the fieldwork for this study. Table 10 shows the composition of cattle herds and the number of herd owners. These five cattle herds consisted of 366 cattle that belonged to 35 households, for an average of 10.5 cattle per household. Compared with Fratkin's (1993) report of an average of 2.6 cattle per household in 1989, the numbers have obviously increased.

On the other hand, although the average number of cattle per herd was 73.2, the herd size varied; the maximum number per herd was RG herd's 112 cattle, while the minimum number was DL herd's 27 cattle. Furthermore, the number of cattle owners for one herd varied; cattle in the RG herd belonged to 11 households, whereas cattle in the DL herd belonged to only one household. Therefore, the maximum number of cattle per household was 27, and the minimum was 5.7. These facts reflect the variations of households' participation in cattle raising. In addition, owners whose cattle belonged to the same herd do not form a subsistence unit.

However, there is no doubt that the Rendille raise more cattle today than in the past. According to field interviews, the herd HE in Table 10 had approximately 40 cattle in 1993,[7] and had increased to 93 in 2003. Also, the herd DL had only six cattle in 1993, but had increased to 27 in 2003.

2. *Construction of Cattle Camps and Relations among the Camp Members*

The sketch map of a Rendille's cattle herding camp is presented in Fig. 28. A large surrounding enclosure is built with entrances in different directions, and fences are built inside to separate different herds. Unlike the camel camp, which has one large enclosure at the center for infants (see Fig. 18), a cattle camp has several small enclosures for infants. The common infant enclosure is not built in the cattle camps because the herds of a cattle camp move and separate

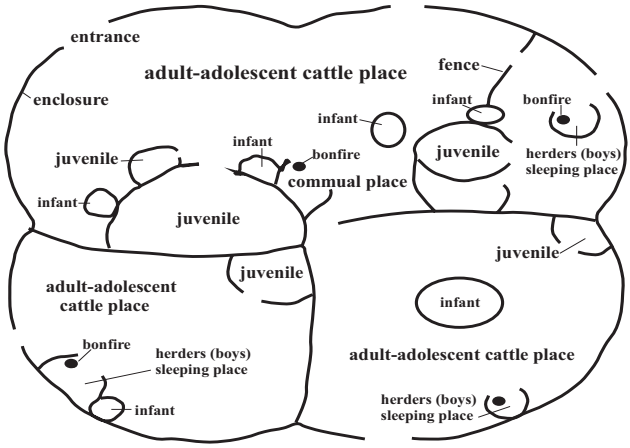


Fig. 28. The sketch map of a cattle herding camp.

Fig. 29. A cattle herding camp located in semi-desert area.

frequently. Since warriors, in the main, manage cattle camps, a communal place is built near the center of the camp, as it is in a camel camp. The branches used for the enclosures of cattle camps are not as large as those used in camel camps, and enclosures for cattle are usually less than 1 m high (Fig. 29). In some cases, if few trees grow near the campsite, small enclosures are built for infants and the bulls and cows remain outside these enclosures. According to the warriors in the cattle camps, the reason cattle do not need a tight enclosure is because they are able to go out to pasture at night and will return to the campsite by themselves, if their infants are held in the camp. Camels do not exhibit this behavior.

Table 11 shows the formation of cattle camps to which the Tupcha's four cattle herds belonged, and the relationships between members of the same camp. Of the four camps observed during dry seasons, only one (D1) was built for a single herd, and the other three consisted of different herds. Only one was built exclusively by Tupcha clan members (C), while the other two camps were

Table 11. Formation of cattle camps and the relationship among camp members.

Dry season			Rainy season		
Camp	Clan of Herd owners	Herd No.	Camp	Clan of Herd owners	Herd No.
A	Tupcha	6	E	Tupcha	5
	Saale	1		Saale	2
B	Tupcha	4		Ariaal	2
	Ariaal	1		Urwen	1
C	Tupcha	2	F	Tupcha	5
				Saale	2
D1	Tupcha	1		Gobore	1
				Rengumo	1
			G	Tupcha	3
				Urwen	2
			H	Tupcha	2
			D2	Tupcha	1
Total		15			27

built by the members of different clans or with the neighboring Ariaal people. In these four camps, the average herd per camp was 3.8, the average number of people per camp was 8.8, and the average human population per herd was 2.3 people.

On the other hand, other observations of five camps during rainy seasons show that the herd with its own camp in the dry season (D1) continued to stay in its own camp during the rainy season (D2). Of the other four camps, which included two to ten herds, only one camp was built for herds belonging to the Tupcha clan (H). Of the other three camps, one was built for three Rendille clans' herds with two Ariaal cattle herds (E), while several Rendille clans built the other two. In these five camps, the average number of herds per camp was 5.4, the average human population per camp was 14.2 people, and the average human population per herd was 2.6 people.

A comparison of the cattle camps during the dry season and rainy season seems to indicate that people prefer to gather together in rainy seasons. However, the seasonal movements of people that occurred between the settlements and camel camps did not occur between the settlements and cattle camps. This can be attributed to the little increase of milk production of cattle during the rainy season. Nonetheless, the cattle camp consisted of more people during the dry season (2.3 people) than the camel camps (1.8 people). Since agricultural products are consumed in cattle camps, more people could live there, even during dry seasons.

The significant difference between cattle and camel camps is that the relationships between members of a cattle camp are variable, and they are not concentrated on clanship, while a camel camp is formed from members of the same clan or sub-clan. In addition, Fratkin (1993) has reported that more Rendille, especially warriors and young boys, speak the Samburu language than was the case in the recent past. This trend is related to the increased interest in raising cattle. As previously mentioned, the Rendille sometimes form cattle

camps with the Ariaal people, who are bilingual speakers of the Rendille and the Samburu languages. Moreover, the current trend of taking cattle to markets in the Samburu District has given the Rendille chances to learn the Samburu language.

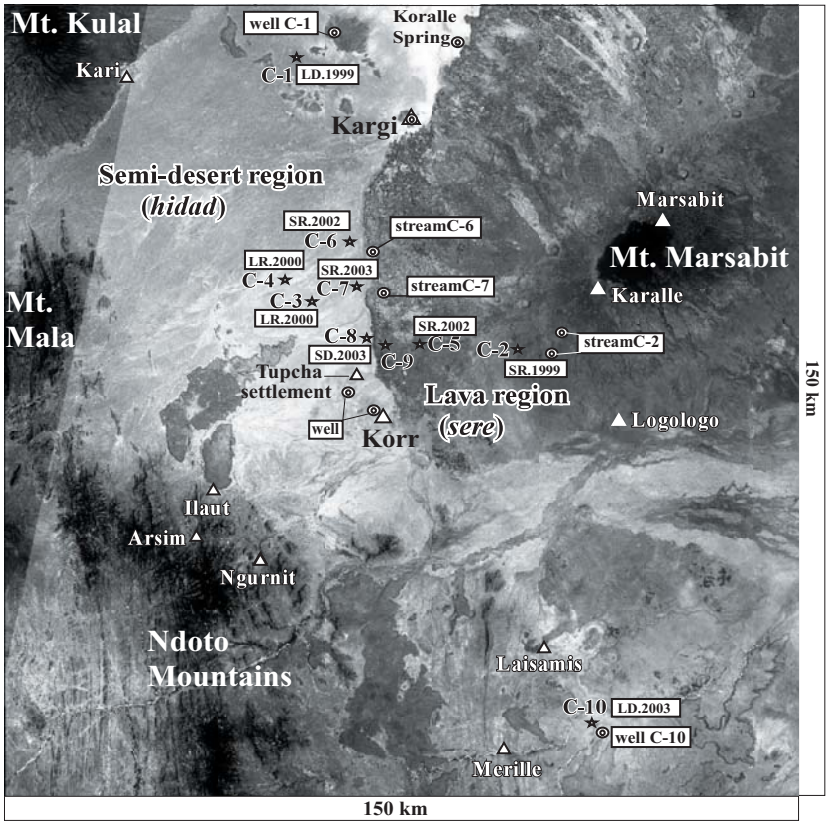
3. *Pasture Area and the Movement of Cattle Herding Camps*

The vegetation of the Rendille land that is bushland and semi-desert grassland is considered inadequate for rearing cattle. However, the Rendille recognize the details of their natural environment. They identify the variation and diversity of vegetation with reference to both space and seasonal change, and have abundant knowledge of how to adjust their cattle to these variations of natural resources. Furthermore, people have increased their ability to raise cattle by digging their own wells.

In Rendille land, since cattle need to be watered every 2-3 days year-round, herding camps cannot be built far from water resources. As previously mentioned, permanent water resources can only be found at the Koralle Spring and the wells near towns. If cattle camps used only these permanent water sources, the places where a camp could be built would be limited. However, the range for herding cattle can be extended, since temporary water points can be found during the rainy seasons, and cattle camps utilize both permanent and temporary water resources. Fig. 30 shows the position of 10 cattle herding camps, which include the Tupcha's cattle herds between September 1999 and September 2003. C-1 and C-10 were the camps during the long dry seasons, while C-2, C-5, C-6 and C-7 were the camps during the short rainy seasons. C-8 and C-9 were the camps during the short dry seasons, while C-3 and C-4 were camps during the long rainy seasons.

During the long dry season, cattle camps moved far away from the settlement. These movements were due to a need for both water and good conditions of the pastures. C-1 was built in September 1999. It was located in the northern part of Rendille land, in an area of small hills and mountains (in the upper center of Fig. 30), which had more vegetation than the central lowlands. There was also a small valley in the mountains where several permanent wells had been dug and water could be used year-round (Fig. 31). In contrast, C-10 was built in September 2003, and was located in southeastern part of Rendille land (in the lower right corner of Fig. 30). It is a place covered with dense trees and grasses, and has three large wadis nearby. Unlike the wadis near Korr, wadis in the southeast region have wide sand riverbeds where water can be found easily by digging shallow waterholes. In addition, these rangelands used during the long dry seasons are considered to be emergency areas where people may come in case of an extended drought.

However, during the short dry season, cattle were kept near the settlement (C-8, C-9). The camp C-8 was located in the lowland region and close to the edge of the lava region, while C-9 was located in the lava region. Both camps used the wells near the Tupcha settlement (see Fig. 12) for water. According to warriors of the cattle camps, it was impossible to keep cattle herds in the central lowlands during dry seasons before digging these wells.



LD: long dry season LR: long rainy season SD: short dry season SR: short rainy season

Fig. 30. Positions of cattle camps and water resources.

Fig. 31. Watering cattle at well C-1 (see Fig. 30).

During the rainy season, cattle camps were built in both the lava region (C-2, C-5) and in the lowland region (C-3, C-4, C-6, C-7). The region chosen for a cattle camp depends on the rainfall. In the lowlands, although vegetation is rare and consists mainly of shrubs, grasses may grow quickly after periods of rain. Of 16 species of plants consumed by cattle in Rendille land (Table 12), nine species of grasses and herbs and three species of shrubs could be found in the lowlands during the rainy seasons.

Moreover, surface water pools can be found in the lowlands after a period of rain, and water can be stored there for 2-3 days. Even when these water pools disappear, people will not move away if grasses remain for the cattle to eat. Instead, they take cattle to the wells near the settlements for water. Compared with the lowland region, the lava region has more grasses and temporary water resources during rainy seasons. Some streams flowing down from Mt. Marsabit may provide water for 1-2 months (Fig. 32). Nevertheless, people do not like to use the lava region during a rainy season because of the spread of mosquitoes.

By comparing the camp and herding areas of cattle herds with those of the camel herds in Rendille land (see Fig. 26), different features of the two species can be identified as follows: camel herds use mainly the central lowlands and

Table 12. Main plant species consumed by cattle in Rendille land.

Plant species	Rendille name	Feature	Place	Season
Cynodon dadtylon	*dedi*	grass	*hidad* [1]	rainy
Dactyloctenium bogdanii S. M.	*maaha*	grass	*hidad*	rainy & dry
Tragus beteronianus	*karkarahis*	grass	*hidad* & *sere*	rainy & dry, important in dry season
Sporobolus sp.	*bukha*	grass	*hidad*	rainy
Cyperus spp.	*chuf*	grass	*sere* [2]	rainy
Aristida mutabilis	*maad*	grass	*hidad* & *sere*	rainy & dry, important in dry season
Enneapogon desvauxii	*lowaano*	grass	*sere*	rainy & dry, important in dry season
Leptothrium senegalense	*lilima*	grass	*hidad*	rainy & dry
Stipagrostis uniplumis	*maho*	grass	*hidad* & *sere*	rainy & dry
Chrysopogon plumulosus	*murrat*	grass	*hidad*	rainy
Selaginella sp.	*jalda*	herb	*hidad* & *sere*	rainy
Crotalaria deserticola	*bonbo*	herb	*sere*	rainy
Blepharis linariifolia	*lemaaruk*	herb	*sere*	rainy & dry
Sericocomopsis pallida	*giib*	shrub	*hidad* & *sere*	rainy & dry
Cadaba farinosa	*gey kuku*	shrub	*hidad* & *sere*	rainy & dry
Indigofera schimperi	*hanahanis*	shrub	*hidad* & *sere*	rainy & dry

1: *Hidad* is the central lowland region called by the Rendille, and the vegetation is semi-desert grassland.
2: *Sere* is the lava region called by the Rendille, and the vegetation is bushland and thicket.

Fig. 32. Watering cattle at a temporary stream in the lava region.

move frequently through the entire region, whereas cattle herds use the spot areas close to water resources in a much wider region. Therefore, raising cattle in Rendille land is not impossible, but relatively unstable, compared with raising camels.

VI. Herding and Management of Small Stock

The Rendille do not separate goats and sheep into different herds, because they believe that herding goats and sheep together improves the herd's mobility, in that goats move faster than sheep. Table 13 shows the numbers and herd populations of small stock that belonged to the Galale settlement in 2003. The settlement (57 households) had 36 herds of small stock, of which 32 herds, belonging to 52 households were studied. Among these 32 herds, 17 herds (53%) comprised animals from one household, 12 herds (38%) comprised animals from two households, and only three herds (9%) comprised animals from three or more households. Thus, unlike camel or cattle herds, which are mainly formed by animals from several households, animals from only one or two households form a herd of small stock.

The average number of small stock per household is 102 animals, but the difference between herds is large. As shown in Table 13, herd No. 18 consisted of 422 animals, while herd No. 17 had only 38 animals. The maximum number of small stock belonging to one household was herd No. 1's 317 animals, and the minimum number belonging to one household was herd No. 29's 20 animals.

When asked, people gave several explanations for the difference in small stock numbers. Small stock have a fast gestation period (3-4 months), and they give birth for the first time at the age of 1-2 years; thus herd size can increase quickly. On the other hand, the number of small stock herds may decrease by half during a long drought. Small stock are used frequently, both for meat and

Table 13. Numbers and population of small stock herds of the Galale settlement (2003).

Herd No.	Owners	Small stock population
1	1	317
2	1	230
3	1	200
4	1	200
5	1	200
6	1	180
7	1	155
8	1	139
9	1	130
10	1	130
11	1	130
12	1	110
13	1	90
14	1	81
15	1	68
16	1	54
17	1	38
17 (53%)	17	2452
18	2	422
19	2	350
20	2	290
21	2	204
22	2	200
23	2	180
24	2	160
25	2	130
26	2	110
27	2	90
28	2	90
29	2	40
12 (38%)	24	2266
30	3	260
31	3	206
32	5	130
3 (9%)	11	596
32 (100%)	52	5314
Average (Number/owner)		102

Fig. 33. Each household slaughtering one goat for the *sorio* ceremony.

for cash income (Fig. 33). Some people have exchanged their small stock for cattle with neighboring cattle herders in recent years. All these factors influence the fluctuation of small stock numbers, which indicates, in turn, the variety of uses for small stock in daily life.

A herding camp for small stock may consist of one herd or several herds and, in some cases, one or two herds of camels or cattle may join the small stock camps. Table 14 shows the composition of small stock camps formed by the Tupcha clan's herds in 1999. During the long dry season, two camps were built close to each other. One camp consisted of 11 herds of small stock, two herds of camels and one herd of cattle, while the other camp consisted of 13 herds of small stock and one herd of camels. When the short rainy season came, the small stock herds of the two camps joined and moved to a new campsite, but their camel and cattle herds did not join the new camp. During the dry season, 69 people lived in two small stock camps, including 58 (84%) young boys and girls, while during rainy season, 64 people stayed in the one camp, including 50 (78%) young boys and girls (Fig. 34). This pattern proved

Table 14. Composition of small stock herding camp.

Camp (herd number)	Married		Unmarried			Total
	Male	Female	Warrior	Boy	Girl	
Dry season						
A (small-stock 11, cattle 1, camel 2)	5	1	1	12	13	32
B (small-stock 13, cattle 0, camel 1)	3	0	1	13	20	37
Dry season total						
(small-stock 24, cattle 1, camel 3)	8	1	2	25	33	69
(%)	(12%)	(2%)	(3%)	(36%)	(48%)	(100%)
Rainy season						
(small-stock 24)	10	3	1	16	34	64
(%)	(15%)	(5%)	(2%)	(25%)	(53%)	(100%)

Fig. 34. Small stock herding camps are usually managed by unmarried girls.

that the Rendille's age system continues to determine their social arrangements and labor distribution.

According to the herders in the small stock camps, camel herds stayed with small stock owing to the shortage of food during the long dry season. During the dry season, the small stock produced little milk, and people stayed in the camps, relying on maize bought from towns to supplement their food supply. Since camels continued to produce milk during dry seasons, in spite of the decline in production, the remaining milking camels in small stock camps supplement the people's maize diet. This arrangement is of great value in preventing malnutrition during the long dry season.

The sketch maps of small stock camps are shown in Fig. 35. The upper map illustrates the dry season construction of camp-A in Table 14. Except for camel and cattle herds, all small camps are spread out widely during dry seasons; however, when they are concentrated in the lava region, the stock are kept in one large circle, where the land is separated by fences into several plots. Small enclosures for infants are built in the center of the circle, and private spaces (*hojop*) for herders' cooking and sleeping are built both inside and outside the circle. Normally, herders from each herd have a single private space for cooking food and eating. In small stock camps, sharing food is not common, and there is no communal place. However, if a goat or sheep is slaughtered, the meat may be distributed to members within the camp.

The lower map of Fig. 35 illustrates the small stock camp during a rainy season, explained in Table 14. Fences separated different herds, and small enclosures for infants were built close to the center. The space in the center of the camp was used for keeping donkeys at night. Since herders of small stock camps are supposed to carry food (mainly maize) and water by themselves, each herd normally keeps one or two donkeys for transportation. Private spaces were built near the entrance of each plot. A noticeable feature of this camp is that each herd followed the same procedure in occupying the plot as that followed by the people when forming settlements.

Although this type of small stock camp is formed only during rainy seasons when watering animals is not necessary, or when the herds move to a new place where security is uncertain, people prefer to set up herding camps with other herds from the same settlement.

Fig. 36 shows the positions of the Tupcha clan's nine small stock camps, which were observed between September 1999 and September 2003. The A, B, D, E, and J camps were built during dry seasons, and C, F, G, and H camps were built during rainy seasons. It is apparent that small stock spread widely during dry seasons, but are concentrated in the lava region during the rainy seasons. This trend relates to the water demands of small stock. During the dry season, small stock need water every 3-4 days, so the camp cannot be far from water points. Camp A in Fig. 36 used the wells close to Kargi, camps B and D used wells near the Tupcha's settlement, camp E used wells in Ngurnit, and camp J used a waterhole that had been dug in a large wadi. However, since small stock can obtain enough water during the rainy season from the plants

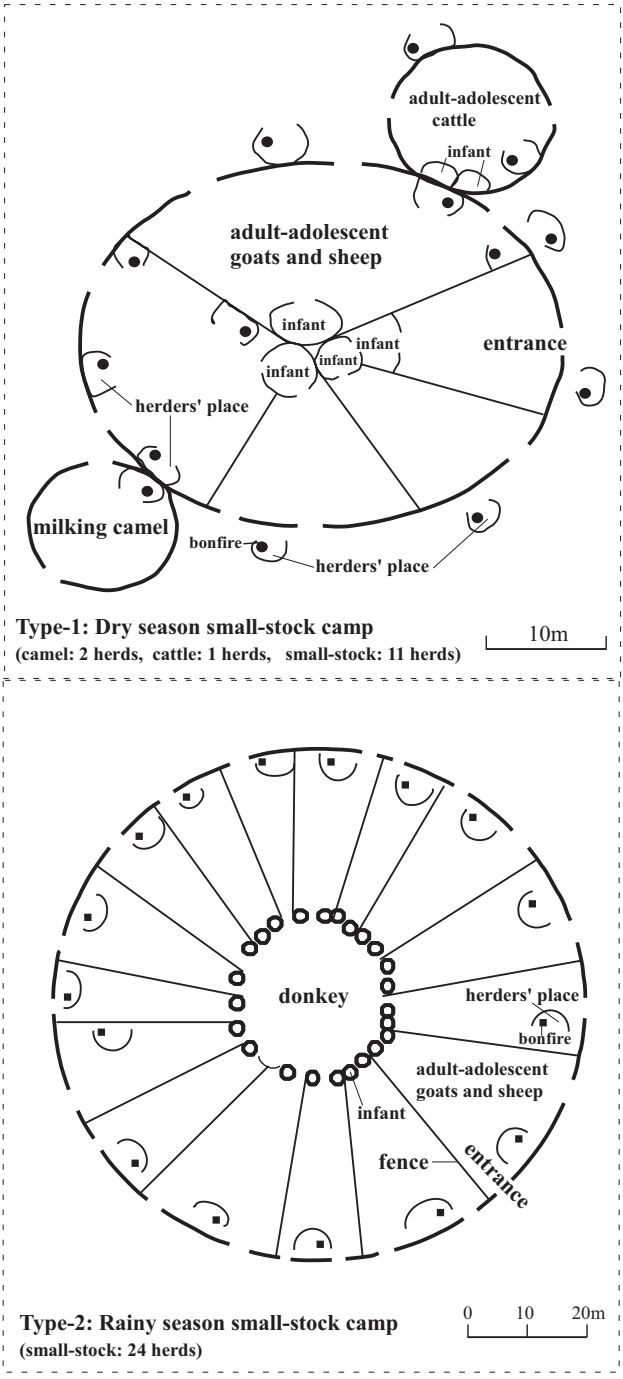


Fig. 35. Formation patterns of small stock herding camps.

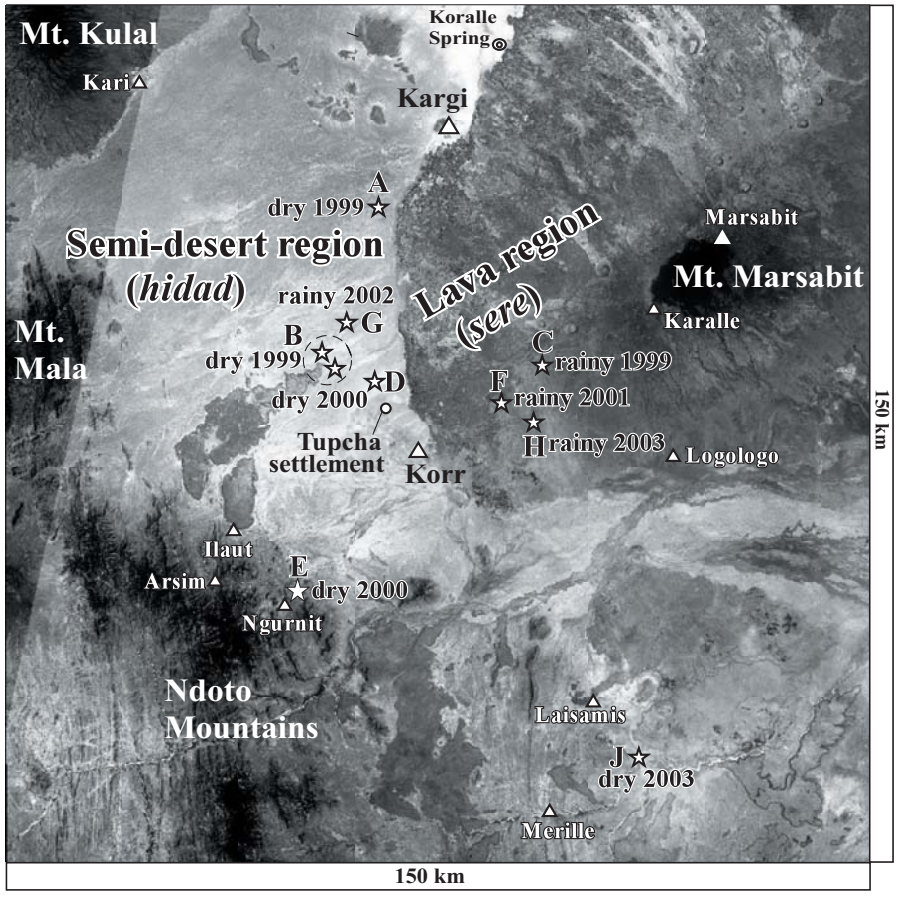


Fig. 36. Positions of small stock herding camps.

they eat, they are taken to places where plants are abundant instead of going to water during these times.

Two camps, E and J, are noteworthy among these small stock camps. Camp E was built in June 2000, near Ngurnit at the foot of the Ndoto Mountains. Primarily Samburu and Ariaal cattle herders occupy the area, and the vegetation is wooded grassland. Normally, the Rendille do not drive their animals to this mountain region, partly because animals may become lost in the dense trees, and partly because they tend to avoid conflict over competing pasture and water with the neighboring herders. However, during a long-term drought in 1999-2000 (recorded as one of the worst droughts in East Africa), people living in the central lowlands were supposed to take their animals to the region close to the surrounding mountains. In northern Kenya, this action often leads to fights among neighboring pastoralists. However, since the Rendille have kept a friendship with the Samburu and the Ariaal for more than a century, they were able to use the region close to their range in the south and southeast without

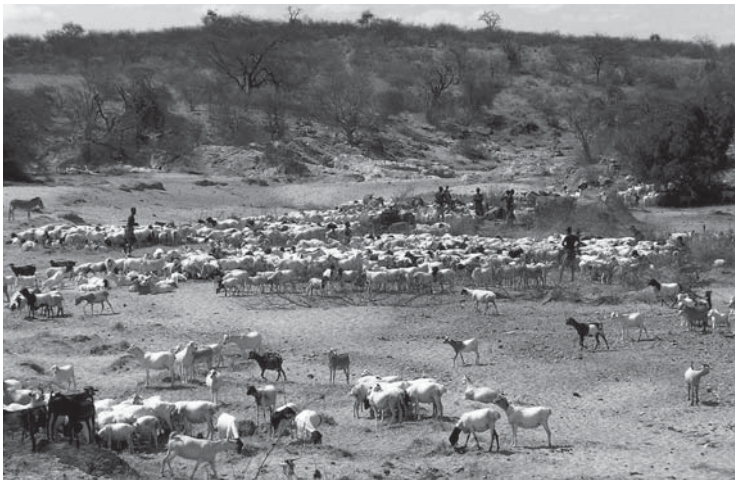


Fig. 37. Watering small stock at waterholes in a big wadi near camp J (see Fig. 36).

conflicts. On the other hand, the hostile relationship with the Boran near the Mt. Marsabit region has limited the Rendille to pastures to the northeast region.

Camp J was built in September 2003, in the southeast part of Rendille land, 70 km from the Tupcha settlement. The region has dense trees and grasses with three large wadis, where waterholes can be dug easily in the sandy riverbed (Fig. 37). During this period, both small stock and cattle stayed in this region. The widely accepted understanding was that conditions of both vegetation and water resources in this region were better than those of the central lowlands. But the people explained that although they knew the condition of region, they could not pasture in the region until recently, due to the tension with the Somali people to the east.

In conclusion, by utilizing the surrounding mountain regions and the rangeland where Camp J located as important reserve resources to escape from natural hazards, efficient movements of herding camps have been demonstrated during a time of relatively stable rainfall and during a year of drought.

DYNAMICS OF PASTORAL SUBSISTENCE IN REACTION TO SOCIO-ECONOMIC CHANGES

The growth of towns, implementation of development projects, and recent sedentarization of pastoral settlements near the towns have strongly impacted the Rendille's subsistence during the last two decades. Several previous studies have focused on different aspects of these impacts. Fratkin (1991, 1998) studied the process of the growth of towns in Rendille land as well as the impact of development projects and missionary activities on the Ariaal and the Rendille. Sato (1996, 1997) did comprehensive research on the regional economic systems of northern Kenya, with special attention on the relationship between pastoralists

and local traders. Smith (1998) investigated changes in the socio-economic status of married men and women among the Rendille who had engaged in farming in the villages built on the top of Mt. Marsabit as part of development projects.

However, since most people still live in the central lowlands and continue their pastoral activities, I looked into how they manage their household economy under today's changing socio-economic environment. To answer this question, both the micro viewpoint of a single household's livelihood and the macro viewpoint of current local economic systems need to be examined. This kind of investigation was undertaken during fieldwork for this paper, and it included observations of a household's income and expenses, and interviews and data collection from the town's merchants. In this section, I describe the Rendille's current household economy in the context of growing economic relationships between pastoral settlements and developing towns, and then I focus on what factors influenced people to engage in new economic activities.

I. Growth of Economic Activity between Towns and Pastoral Settlements

As mentioned in previous sections, except for the people living in the agrarian villages and those employed in towns, more than 80 percent of the Rendille population still maintain their subsistence herding lifestyle. However, among settlements and herding camps, only the herders living in camel camps rely exclusively on livestock products. People in cattle camps consume agricultural products during dry seasons, and people living in small stock camps consume agricultural products throughout the year. Moreover, people living in settlements depend much more on agricultural products than on livestock. On the other hand, since the Rendille who settle in the central lowlands are not engaged in any cultivation, agricultural products are either obtained from the relief distributions or purchased from the merchants living in towns.

Before the advent of towns in the central lowlands, it has been reported that the Somali traders transported agricultural products and general merchandize by caravan, and bartered with the Rendille. Furthermore, according to interviews with the oldest Somali merchant, who had resided in Korr for more than two decades, the Rendille used to travel long distances to buy food and general goods and transported them by camels or donkeys before their settlements moved closer to towns. As they did not travel to towns regularly, they were unaware of price fluctuations in agricultural products.

However, more than 20 permanent shops are now located in Korr, and more than 50 settlements exist near the town today; the local economy has grown quickly, and the contacts between people of the towns and of the settlements have become frequent. In addition to the distribution of relief foods by the missions and the work of development agencies in the town, people living in settlements, especially married women, now visit Korr every 3-4 days.

Relief foods have been distributed in Korr by missionaries such as the Catholic Mission and the AIC, and by international agencies such as the FH

(Food for the Hungry) and the WFP (UN World Food Programme). This distribution of food was one of the major reasons the Rendille settled near Korr during the 1980s (Fratkin, 1991, 1998). Today, relief foods are not often distributed in Korr except during extended drought periods. People living in settlements do not consider relief foods a major part of their food supply, though they expect to receive such foods for free.

Fig. 38 illustrates how a household in the Galale settlement purchased maize from a shop in Korr over three months (April 21 - July 20, 2000). Maize is a principal part of the diet in Rendille settlements, and three types can be found in the local shops. Maize grain and milled maize are common, but maize flour in a package is unusual. Married women usually go to the town every 3-4 days to buy food, and Fig. 38 illustrates these purchasing patterns, as observed during the period between April 21 and June 1. Over 42 days, the housewife of this household went to buy maize (either grain or flour) 12 times (29%). However, from June 2 to July 20 (49 days) she went to the town only six times (12%). Furthermore, she bought 47.25 kg of maize during the first 42 days, and 27.25 kg during the other 49 days. This change might have been due to the distribution of relief foods.

In 1999-2000 an extended drought was recorded, and relief foods were distributed by the WFP and by missionaries in northern Kenya. During the observation period previously mentioned, people of the Galale settlement received maize flour four times: 20 kg per household on June 1 from WFP, 5 kg per household on June 26 from the Catholic Mission, 20 kg per household on June 28 from WFP, and 20 kg per household on July 12 from WFP. As suggested by Fig. 38, this household did not go to buy maize for ten days after they had received relief foods (intervals between the bars in Fig. 38). Generally, when relief foods are sent to Korr, married men from settlements go to the town to attend a meeting at which schedules for receiving food are set

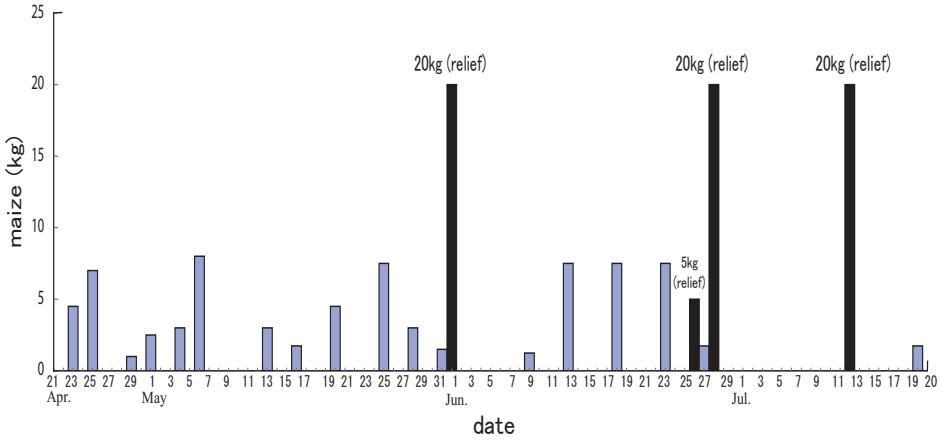


Fig. 38. Maize purchasing pattern of a household from the Galale settlement in 2000 (42 days).

up. Then it is married women's job to go to the town and pick up their food. Since the food is carried to settlements by manpower alone, it is difficult work for the women if the settlement is far from the town. Therefore, while relief food is as an important supplement for the Rendille during periods of drought, it is undeniable that relief distribution promotes the sedentarization of the pastoral settlements.

II. Current Household Economy

People in settlements buy not only staple food such as maize, but also luxury items such as sugar, tea, chewing tobacco, and general goods such as clothes, sandals and torch batteries. However, the cash income of people living in settlements is very limited. Except for selling animals, usually goats and sheep, people have few opportunities to earn cash. Therefore, I examined how people buy goods from the shops without cash.

A notable feature of the business relationships that pertain between shops in Korr and people in settlements is a "credit" system described by shopkeepers. When people from a settlement need to buy food or goods but do not have any money, they first go to those shops where the shopkeepers either know them or have a relationship with someone from the same settlement or clan. Then, people from the settlements order their goods and let the shopkeeper write their names in a notebook; thus, an individual's "credit" account starts. Generally, people continue to purchase goods at the same shop in order to strengthen their credit until they have money to repay their debt. Undoubtedly, this credit system requires mutual trust between shopkeepers and buyers. If the people from the settlements allow their credit increase but do not have the ability to repay, the shopkeeper may suffer a loss. Conversely, if the shopkeeper refuses to continue their credit, people from the settlements may suffer food shortage problems. During an interview with the shopkeepers, most of them said that they believed that debts, generally, would be repaid. Furthermore, by maintaining strong relationships with some members of the settlements, the shopkeepers obtain the information about people's property, such as livestock numbers and, on the basis of this information, decide the amount that they will extend credit. Fig. 39 shows the shifting patterns in the amount of credit and repayment for a household from the Galale settlement; the data were collected from a shopkeeper's credit books.

The head of the household worked as a watchman in Nairobi and left his wife and three small children in the settlement. Within a total of 301 days, from January 12 to November 8 in 1999, the housewife of this household went to the shop 69 times, with an average of 4.4 days between shopping trips. The total amount of her expenditure was 12,928 Ksh (Kenyan Shilling; 1 U.S.$ = 75 Ksh), and her average per shopping trip was 187 Ksh. The bar chart in Fig. 39 shows the increase and decrease of credit after purchase and repayment. In a comparison of her monthly expenditures, it was found that she spent more money during the long dry season from August to November. During the entire

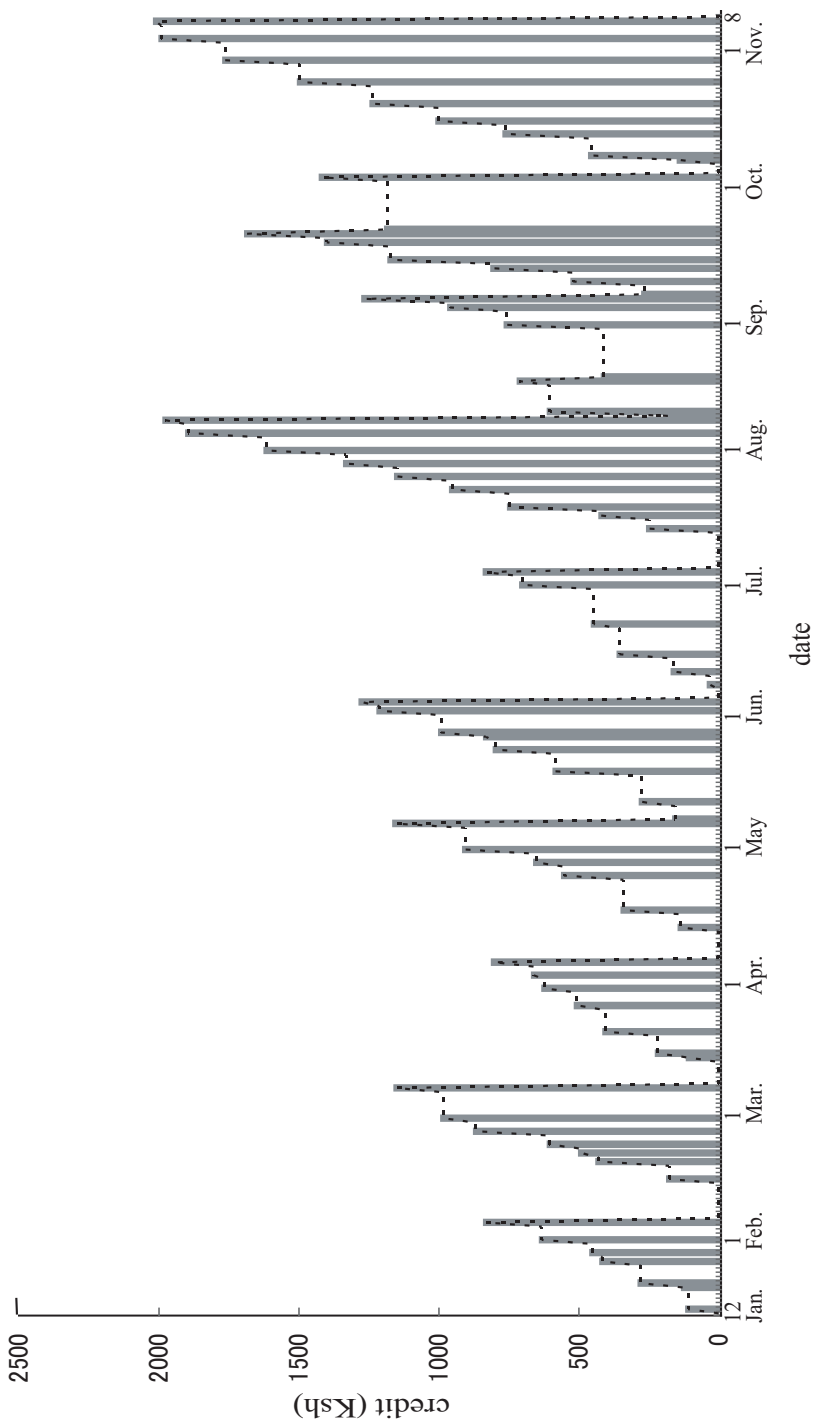


Fig. 39. Shifting pattern of the amount of the credit and repayment of a household from the Galale settlement in 1999. (301 days, Ksh: Kenyan Shilling, 1 U.S.$ = 75 Ksh)

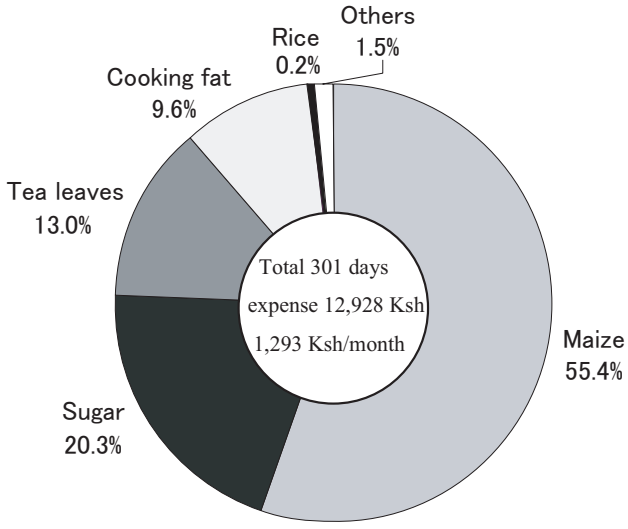


Fig. 40. Proportion of expenses of goods purchased by one household in 1999. (Ksh: Kenyan Shilling, 1 U.S.$ = 75 Ksh).

observation period, the housewife repaid the credit a total of 10 times; this pattern is illustrated in Fig. 39 by the rising and falling of the broken line. This household could repay its credit regularly because of the money the head of the household sent from Nairobi. According to the housewife, her husband sends her 1,000 Ksh per month. As there is no postal service in Korr, such money is normally carried back by someone travelling from Nairobi.

Fig. 40 illustrates the proportion of goods purchased by this household. The goods include: maize (55.4%), sugar (20.3%), tea leaves (13.0%), cooking fat (9.6%), rice (0.2%), and other items such as batteries, chewing tobaccos, etc. (1.5%). It is obvious that almost all the money was spent on food. The average expenditure of this household is 1,293 Ksh per month, a sum that can be considered as the basic cost of living for a household in a pastoral settlement around the town.

However, this example cannot be considered as a typical purchasing pattern in the pastoral settlements around Korr because it is uncommon for the average household in the settlements to have a family member employed as a wage earner in big city, who is able to send money regularly to his family. For those households that do not have regular sources of income, the purchasing and credit repaying patterns differ from the case previously mentioned. Fig. 41 illustrates the shift in the amount of credit from another household in the Galale settlement. This household consists of four members: husband, wife, and two small children. During 85 days from April 1 to June 24 in 2000, the housewife bought goods from a shop 12 times; she went to this shop every seven days, on average. The total expenditure of this household was 1,304 Ksh over 85 days, with an average of 109 Ksh per shopping visit. As illustrated

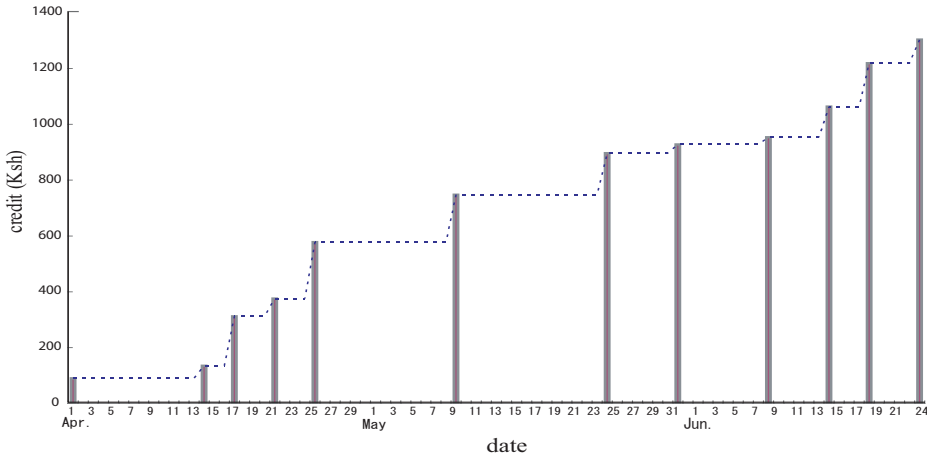


Fig. 41. Shifting pattern of the amount of credit of a household from the Galale settlement in 2000. (85 days, Ksh: Kenyan Shilling, 1 U.S.$ = 75 Ksh).

by the rising broken line in the figure, this household has not yet repaid their credit, incurred during this period.

According to the shopkeeper, the type of household shown in Fig. 41 is common among the settlements around Korr, and the credits may increase to a maximum of 7,000 Ksh during the long dry season when animals are so far from the settlement that the people cannot sell them for income to repay their credit. If the credit level becomes high, shopkeepers might ask for repayment more frequently and refuse to give more credit. Meanwhile, people from the settlements are supposed to try to find cash to repay their credit. As described in the last section, the extended drought in 2000 forced the Rendille to move their small stock herds far from the central lowlands and, not being able to sell their small stock, the credit levels of the people in the settlements quickly increased. Under such circumstances, people had no way to earn money except by selling their camels to the butcheries in Korr. Between January and July 2000, eight male adult camels from the Tupcha's two settlements in Korr were sold to the butcheries, including four camels sold in June and July. According to the people from the Galale settlements, camels are not sold to butcheries to pay off credit as often as they are during a drought. In reality, all eight camels were sold to repay credits. The proceeds from selling the meat of a male adult camel at butcheries in Korr are about 7,000-9,000 Ksh, and 350-500 Ksh are given to the butchery as a commission.

III. Response to the Growing Cash Economy

The increasing numbers of people settling near towns have greatly influenced people's daily economic activities over the last two decades. The following is an example of the changes in expenses for weddings among different age-sets. As mentioned in the first section, the time of circumcision and marriage

is regulated by the age system, and men from the same warriorhood should generally get married at a similar period of three years. The wedding is held at the bride's father's settlement, and it is the bridegroom's duty to prepare for the ceremony. Usually, a male infant camel is slaughtered in the traditional wedding ceremony, but today most young men have switched to the Samburu style ceremony, in which only small stock are slaughtered. During the ceremony, people from both the bride and bridegroom's settlements are welcomed and are offered plenty of tea and chewing tobacco. The bridegroom prepares the animals for slaughtering, as well as the sugar, tea leaves, and chewing tobacco for the guests. The list of these items and their expenses are shown in Table 15.

When warriors of the Ikichiri age-set held their wedding in 1976-1979, 1-2 kg of sugar, driblets of tea leaves and chewing tobaccos were prepared. When warriors of the Ikororo age-set held their wedding in 1990-1993 (a transition period of sedentarization), each warrior bought 2-10 kg of sugar, driblets of tea leaves and 1-2 kg of chewing tobacco. However, when warriors of the Irmori age-set prepared to hold their weddings in 2002, each was required to buy 50-100 kg of sugar, 80 bags of tea leaves (50 g/bag), 4 kg of chewing tobacco, 3-5 pieces of clothing and one cattle hide. These items would cost a warrior 6,000-9,000 Ksh.

According to interviews with people from different age-sets, the reason for the increase in wedding costs is because of the settlement sedentarization near the towns. Before people settled near towns, the distances between different clan's settlements were greater, and the wedding ceremony was held only for close relatives of the bride and bridegroom; thus, smaller amounts would be enough. Once more people settled near the towns, visiting other settlements became more common and people enjoyed attending the wedding ceremonies. Thus, more provisions were required to offer the expanded number of guests (Figs. 42, 43). Furthermore, weddings have developed into a competitive situation between warriors of different clans for showing off their wealth and generosity. Through interviews, it became clear that all the money that warriors of the Irmori age-set had spent on their weddings had come from selling cattle to the market.

The numbers of camels and cattle that were slaughtered or sold by the

Table 15. Increases of items and expenses for wedding (Ksh: Kenyan Shilling, 1 U.S.$ = 75 Ksh).

Items	Age-set (Year of wedding)			
	Ikichili (1976-79)	Ikololo (1990-93)	Irmori (2002-05)	
			Quantity	Amount (Ksh)
Sugar	1-2 kg	2-10 kg	50-100 kg	2200 - 4400
Tea leaves	driblets	driblets	50 g/bag x 80 bag	800
Chewing tobacoo	driblets	1-2 kg	4 kg	640
Cloth			3-5 pieces	1050 - 1950
Cattle hide			1 piece	1200

Fig. 42. Transporting wedding goods.
(The Rendille used to load building materials like this way and moved their settlements frequently. But such scene can only be seen in wedding periods now)

Fig. 43. Married women assemble for a wedding.

Tupcha's two settlements in Korr were recorded from November 2002 to March 2003, that is, during a short rainy season and a short dry season. Since relatively abundant rain fell in December and January, some milking camels and small stock were kept in the settlements, and people were able to consume both milk and meat. Although no camels were slaughtered or sold during this period, 12 cattle were sold to livestock markets, seven cattle sold for warriors' weddings, two for hospital fees, and three for secondary school fees. Based on interviews, people in the settlements tend to sell cattle when they need an amount of money. This trend is related to the situation of the livestock market in Rendille land.

There is no permanent livestock market in Korr. When people want to sell animals, they take them to the markets either in Marsabit or in other towns to

the southeast, such as Wamba and Isiolo. Since animals traded at these markets are mainly for meat to supply cities such as Nairobi, cattle for beef are quite valuable and can sell for the highest price among livestock. In contrast, the most important animal for the Rendille's subsistence, the camel, fetch a lower price at the market. Thus, the increased need for cash in the settlements and the high price of cattle in the livestock market has led the Rendille in the central lowlands to promote the raising of cattle in recent years.

As mentioned in the third section, although cattle cannot produce enough milk for herders' daily lives, and although the unpredictable environment has led the Rendille's cattle to move for pasture and water in a wide region, the number of cattle per household has increased four times in the last two decades. It is obvious that raising cattle has become the most feasible strategy for the Rendille in relation to the growth of the cash economy inside Rendille land.

Employment as a migrant worker is an alternative way to earn money outside Rendille land. Although the growth of Korr had extended the cash economy into the Rendille's pastoral settlements, it has created few opportunities to improve people's cash income. In recent years, with the development of the transportation system, some Rendille have left Rendille land and become wage-earning workers in Nairobi or in other cities in southern Kenya. As shown by the regular credit repayment pattern of the household shown in Fig. 39, the money these workers send back to their families in the pastoral settlements solves some of the cash demand problems that have arisen with the rise of the cash economy in Rendille land.

In 2000, ten married men and three warriors from the Tupcha's two settlements in Korr were working in Nairobi. This is about 14% of the total number of married men, and 6% of the warriors. All of them were working as watchmen and staying at one place in Nairobi. According to interviews with them, they found it inconvenient to live in Nairobi. First, few of them could speak either English or Kiswahili, which are the official languages of Kenya and are recognized as the basic communication languages in Nairobi. Second, because their skills in herding livestock were useless in Nairobi, they could find only heavy physical work such as night watchmen, and even opportunities for jobs such as these were few. Third, their wages were very low, and they not only had to send money back to their families, but they also had to pay the high cost of living in Nairobi.

However, these migrant workers are treated as wealthy persons in Rendille land. When they return to their settlements during holiday breaks, they must bring presents for the people of their settlements. According to one of the married men working in Nairobi, gift giving is a way to maintain close relationships with the people in the settlements, so that when he goes back to Nairobi, people living in settlements will help take care of his family as well as his livestock.

Though few migrant workers earn a good wage, they still try to save money to buy livestock. During the period of this study, a married man who had

worked in Nairobi for several years returned to the Galale settlement for a holiday, and bought two adult male camels from two households in the same settlement. According to him, he tried to buy female camels, but could not find any to buy; therefore, he bought male camels and expected to exchange them for females at a later time. Both heads of the two households who sold the male camels explained that they needed cash to repay their household's credits at shops in Korr.

For warriors, working in Nairobi appears to be more attractive. As they do not have families to support, they may spend their wages more freely than married men. During the period of this study, two of the three warriors of the Tupcha settlements living in Nairobi came back to the settlements for holidays. Both of them dressed themselves up with colorful bead ornaments and clothes; they also had wristwatches and carried radios. Instead of bringing presents, they narrated their stories and experiences of living in Nairobi. Both their colorful clothes and their stories attracted other warriors and young boys who had not been to such cities.

Compared to the married men, relatively few warriors have stayed and worked in Nairobi up to the present time. Interviews with the Tupcha warriors revealed that most of them show some interest in working outside. Nevertheless, most warriors have also reached a consensus that, as warriors, they have responsibilities to manage their livestock as leaders in the herding camps, and that this prevents them from seeking employment outside of Rendille land. In addition, as mentioned in the second section, a Rendille man must pay eight camels as bridewealth in order to get married. Warriors who manage livestock in the camps may have opportunities to ask for help (animals) from the herd owners, whereas warriors working in Nairobi must save money and buy the animals themselves.

In conclusion, if the growth of the cash economy between settlements and towns is inevitable, and people living in pastoral settlements must seek cash income, both raising cattle and working for wages are the Rendille's current responses to the cash economy; they also constitute diversification strategies in relation to pastoral subsistence. The ways people view these new economic activities, and what influences their participation in new activities, has become important for understanding current pastoral subsistence. These issues are set out in the following sub-sections by examinations of the dynamics of the value of livestock, changes of the ownership and utilization of natural resources, and the management of labor for current cattle raising.

IV. Changes in Livestock Value

1. *Camels for Milking and Cattle for Consumption*

Raising multiple species of livestock (camels, cattle, goats and sheep) is an important adaptive strategy used by pastoralists in response to the uncertain environment in East Africa. Commonly, pastoralists are categorized as "camel pastoralists" or "cattle pastoralists" based on the species most important to their

livelihood. However, the productivity or biological features of livestock do not necessarily determine what livestock the pastoralists prefer or how they value different species. For example, Itani observed how the Turkana herders suffered from a terrible drought in 1979-81 and noted that "sheep were consumed first, camels followed, and then goats, but cattle were kept until the last moment" (1982: 212). Though camels and goats are more likely to survive during a drought than cattle, the Turkana tried to reserve the cattle because they valued them most highly. Therefore, focusing on the changing value of livestock may help us examine current pastoral subsistence in more depth.

The Rendille have been recognized as camel pastoralists for a long time; they view the camel as undoubtedly the toughest and most productive livestock in Rendille land. However, as previously mentioned, the Rendille have been raising more cattle in recent years. Thus, to understand the Rendille's current situation with respect to pastoral subsistence, I should study differences in value between camels and cattle.

The high value of the camel in Rendille society can be viewed in several ways. For example, bridewealth is defined as the gift of eight camels, four males and four females, from the bridegroom to the bride's kinsmen; in addition, a male infant camel is slaughtered at the traditional wedding ceremony for guests; and all camel herds of the Rendille are asked to gather together during the men's circumcision ceremony, every fourteen years. In addition, with respect to the traditional sacrificial ceremony, the *sorio,* held four times a year, three of these occasions are reserved for camels, and all camel herds return to the settlements during the ceremonies (Fig. 44). Furthermore, by focusing on the ownership and the management of camels, I found that only camels are branded with a clan or sub-clan's original brand, and the ears of camels are cut with a special sign by its owner. Among all livestock, only female camels are given a special name by which its owner's clan can be identified. Camel herds belonging to the same settlements are pastured together and managed in the

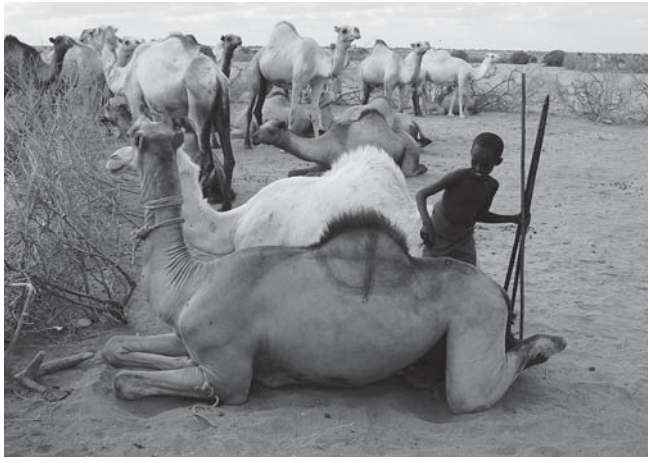


Fig. 44. Camels are marked with blood from sacrificial goats during the *sorio* ceremony.

same herding camp; and only the camel camp has the evening prayer (*ololo*). Moreover, it is significant that the "trust system (*maal*)" highlights the value of camels in Rendille society. The system's distinctive feature is that a female camel can be entrusted from one household to another, and the trustee must treat both the entrusted female camel and its female offspring as trust camels, meaning that all female offspring of the entrusted female camel belong to the original owner (Sato, 1992b).

In comparison, cattle seem to have less value for the Rendille. There are no ceremonies, special names, or original markings for cattle, nor do special transaction systems exist for cattle. In addition, people from different clans often form their cattle camp together. This would suggest that cattle are seen as less valuable than camels.

However, the current value of cattle varies largely from individual to individual and, in some cases, cattle are considered to have the same value as camels. For example, in Rendille society, a bridegroom is required to prepare eight camels as bridewealth, but if the bride's kinsmen (who have the right to receive the bridewealth) accept cattle, then the cattle can be substituted at a one-to-one rate, i.e., one ox or cow is equal to one male or female adult camel in value. Such payment of bridewealth was prevalent during this study. In addition, there is a unique description used to compare cattle with camels, "a cow has four breasts, just as a camel does, so they are equal to each other."[8]

Interviews with married elders and warriors revealed different views on the value of cattle. A senior of the Irikimaniki age-set (estimated to be 65 years old) mentioned, "Both digging wells (near the settlement) and raising cattle are practiced by young people, but we, the senior elders, know neither digging wells nor raising cattle." In contrast, warriors in cattle camps strongly emphasized cattle's value in relation to its market value. As they noted, camels are for milking (*alamara*) but cattle are for eating (*ataham*). They explained that "eating" in this phrase does not mean cattle are slaughtered for meat; instead, it means that they will sell cattle and buy food in the towns. Moreover, most warriors agree that without selling cattle, they cannot finance their wedding ceremonies. Consequently, these differences in value between camels and cattle represent their functions in supporting Rendille pastoral subsistence. That is, camels support the self-sufficient economy, whereas cattle provide opportunities for responding to the growth of the cash economy.

2. *Traditional Exchange Modes and Current Market Prices*

In East African pastoral societies, bartering has long been practiced both within the communities and with neighboring ethnic groups. Table 16 describes some basic standard rates of exchange among livestock and between livestock and general goods in Rendille society. However, these rates are not fixed, and they provide only a reference with which people negotiate actual exchanges.

The following examples demonstrate how people are engaged in exchange.

> I asked an elder, known as a cattle holder in the Galale settlement, about how he increased the number of his cattle. He explained that he used to have a large

Table 16. Basic exchange rates among livestock and artifacts.

Adult male camel (*folas*) 1	=	Camel heifer (*khalim-deiyeh*) 1 Cattle heifer (*urhal*) 1 Goats or sheep (*adi*) 12
Adult male cattle (*her*) 1	=	Cattle heifer (*urhal*) 1 Goats or sheep (*adi*) 12
Cattle heifer (*urhal*) 1	=	Adult male camel (*folas*) 1 Adult male cattle (*her*) 1 Goats or sheep (*adi*) 12 Female donkey (*ehel-deiyeh*) 1
Adult male donkey (*ehel win*) 1	=	Goats or sheep (*adi*) 12
Female donkey (*ehel-deiyeh*) 1	=	Cattle heifer (*urhal*) 1 Goats or sheep (*adi*) 12
Adult male goat (*warab*) 1	=	Male cattle calf (*maro*) 1 Goats or sheep (*adi*) 3
Spear (*toor*) 1	=	Mature goats or sheep (*waharo* or *siben*) 1
Sword (*birlab*) 1	=	Mature goats or sheep (*waharo* or *siben*) 1
Wooden camel bell (*kooro*) 1	=	Mature goats or sheep (*waharo* or *siben*) 1
Metal cattle bell (*daam*) 1	=	Female sheep (*siben*) 1

number of small stock, but when he built his small stock camp in the region where the Ariaal cattle herders settled, he exchanged his small stock for the Ariaal's cattle. The rate he adopted for the exchange was one heifer for ten female small stock animals plus two male small stock animals.

During my interviews with the warriors of the cattle camps about their bridewealth, they mentioned that although they had not enough camels for bridewealth, they could pay with cattle, or exchange cattle for camels with someone who wanted cattle. Referring to the rates shown in Table 16, they could easily calculate whether they had enough livestock to pay the bridewealth.

However, as mentioned in the last section, the growth of the cash economy between settlements and towns has strongly influenced the Rendille's lives in recent years. People have become accustomed to buying goods and food from the shops in towns, using credit or cash, and they know the prices of goods in shops and how to calculate their expenses. Furthermore, since people go and sell their livestock at the livestock market in Marsabit or in other large towns more frequently than they did in the past, they know the market prices of their livestock. Thus, a new question emerges: how do the Rendille use their traditional rates of exchange on the one hand, and livestock's market price on the other? Here are some case studies aimed at answering this question.

There is a Boran man from Korr, who is engaged in digging wells. Given that he came to dig wells with the development agencies, he was known as a man who knew how to dig wells, and where the water was. During the period of

fieldwork for this study, he was hired by the people of the Galale settlement to dig two wells on the bank of a wadi near the settlement. According to the two employers, the Boran man asked for 4,500 Ksh per well. True to what he asked for, one employer paid him 4,500 Ksh in cash, whereas the other employer gave him an adult male camel. In Rendille society, giving someone animals in exchange for work is common. In this case, in comparison with the 4,500 Ksh the Boran had asked for, the adult male camel offered by the other employer should have a market price of 7,000-10,000 Ksh at the butchery in Korr. It is obvious that the employer did not consider the camel's market price when he gave it to the Boran man.

The Rendille man generally carries a sword (*birlab*), which is regarded as an all-purpose tool for cutting meat, woodworking, and self-defense. Only a settlement called Tumaal near Korr has blacksmiths who make such swords. The Rendille's usual exchange rate for a sword is one small stock animal, but recently, such a sword could be bought for 800 Ksh in cash. During my fieldwork for this study, an elder from Galale settlement asked me to lend him some money to buy a sword because his had broken. However, a few days later the blacksmith came to the settlement and took one goat from the elder's small stock enclosure. The elder explained that "the price of small stock at Korr is between 300 Ksh and 600 Ksh these days, if I pay cash for the sword, I have to pay 800 Ksh, but if I pay with animals, one goat is enough." In this case, the elder clearly took the livestock's market price into account when he chose the better exchange rate, while the blacksmith followed the Rendille's traditional exchange mode.

From the above cases, we can see the difference in people's preferences and practices in their daily lives regarding traditional exchange rates and the market prices. In reality, although most people are aware of the livestock's market price, few have really valued the profit and loss in relation to both prices.

The Rendille have only recently begun to pay more attention to the market prices of livestock, and to compare the prices of different markets before selling animals. As previously mentioned, since there is no permanent livestock market in Korr, people living near the town were supposed to take their animals to the market in Marsabit, a four-day walk for a single trip. In spite of the long distance, some people, attracted by the high market price, have begun to take their livestock, mainly cattle, to the towns in either the Isiolo District or the Samburu District. According to a warrior of the Galale settlement who has traveled to all of these markets, a bull is sold for 6,000-9,000 Ksh at the market in Marsabit, while it is sold 12,000 Ksh at the market in Wamba situated south of Rendille land. Furthermore, if someone takes a bull to the livestock market in Suguta Marmar in the Samburu District, it can be sold for 14,000-16,000 Ksh, twice the price in Marsabit. However, a one-way trip from Korr to the large market in Suguta Marmar takes ten days.

Though the livestock markets in northern Kenya exist mainly to supply meat to big cities, some Rendille are trying to take advantage of livestock trading in order to develop their herds. For example, a warrior of the Galale settlement

sold four small stock for a total of 4,000 Ksh at the Marsabit market. Then he added 3,000 Ksh that he had saved and bought a heifer for 7,000 Ksh at the market. According to him, it was almost impossible to buy a female camel or cattle at Korr since everyone tried to keep their female animals for milk production and reproduction. Thus, the larger market provided him with a chance to own a heifer, with which he could build his own herd. In addition, he bought this heifer from a Boran herder through brokers of the market.

V. Changes in the Ownership of Natural Resources

Land, water, and livestock are recognized as the principal resources for pastoralists in the arid area of East Africa. The ownership and management of these resources have been considered key to maintaining pastoral subsistence under uncertain environmental conditions. Many studies conducted in the last two decades have pointed to the impact on and damage to the pastoral lives of local people arising from rangeland privatization (Campbell, 1993; Galaty, 1994). In Rendille land, except for the Marsabit National Park and the farms at the top of Mt. Marsabit, the Rendille still treat all areas as communal lands. The main reasons why the Kenyan government has not imposed land privatization on Rendille land are the unpredictable climate and the unproductive land, in terms of cultivation. On the other hand, these circumstances give the Rendille a great advantage as far as maintaining their pastoral activities, which require high mobility.

However, as mentioned in the second and third sections, the water resource development projects introduced to Rendille land by international development agencies in the 1980s have greatly changed the water use patterns of the Rendille. The shallow wells dug by the Rendille themselves have influenced both animals' watering patterns and their movements. If these wells are considered new natural resources, studies on the ownership and utilization of the wells by the Rendille will shed light on their current view of natural resources. The following is an analysis of the six wells dug by members of the Tupcha clan's two settlements in Korr (see Fig. 12).

Well-**i** was dug in 1992 and was the first well in this area. The GTZ surveyed the ground water, and a group of married men from the same lineage dug the well. People from this lineage argued that the well belonged to them. In 1998, well-**ii** was dug by six married men from another lineage, and they said that they owned that well. In 1999, two brothers, both of whom were married men, dug well-**iii**. A Boran employee dug well-**iv** and well-**v** in 2000-2001. Well-**iv** belonged to two married men who were paternal cousins and had paid the employee 4,500 Ksh to build the well. Well-v belonged to one married man who paid the Boran employee one adult male camel to build the well. In 2001, two brothers, both of whom were married men, dug and cemented well-**vi**, the newest of the Tupcha clan's wells (Fig. 45). Thus, a well could be owned by individuals or a group of people, and could be owned not only by the people who dug the well, but also by those who paid for the

digging.

In order to understand how wells are used to water livestock and the relationship between well owners and herd owners, I observed the schedule of watering livestock at wells **i**, **ii**, **iii**, and **iv** during a 50-day period in 2000. Since more than one herd used each well during the course of a day, I counted each time a herd used one well as one use (Table 17). During this period, nine herds of cattle and 11 herds of small stock used these four wells a total of 197 times, and each day at least one herd used each well. The relationship between well owners and livestock owners falls into several categories: well owners using their own wells for their own herds; herd owners, who may be people of the same lineage as the well owner using wells for their herds, herd owners

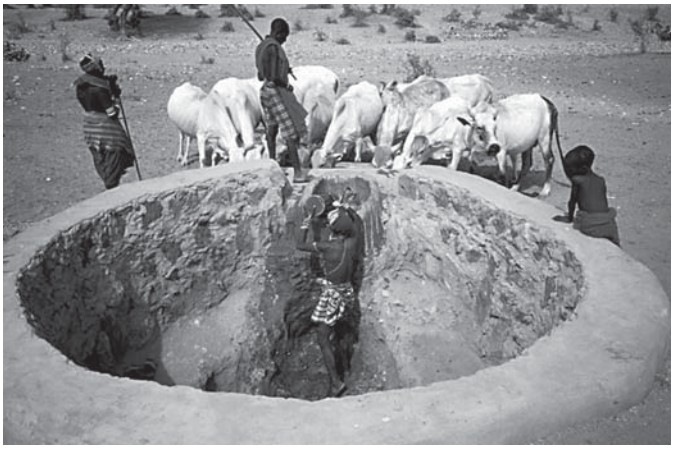


Fig. 45. Well-**vi**: The newest cemented well of the Tupcha settlements (see Fig. 12).

Table 17. Relationships between well owners and users (50 days in June-July 2000).

Relationships	Frequency of well use [1]				
	well-**i** [2]	well-**ii** [2]	well-**iii** [2]	well-**iv** [2]	Total
owner	57 (70%)	0 (0%)	14 (24%)	13 (45%)	84 (43%)
same subclan	0 (0%)	25 (83%)	21 (37%)	0 (0%)	46 (23%)
affinal relationship	24 (30%)	0 (0%)	0 (0%)	0 (0%)	24 (12%)
same lineage	0 (0%)	5 (27%)	0 (0%)	14 (48%)	19 (10%)
same clan	0 (0%)	0 (0%)	13 (23%)	0 (0%)	13 (7%)
others	0 (0%)	0 (0%)	9 (16%)	2 (7%)	11 (5%)
Total	81 (100%)	30 (100%)	57 (100%)	29 (100%)	197 (100%)
Number of herds	cattle 3 small-stock 4	small-stock 4	cattle 4 small-stock 2	cattle 2 small-stock 1	cattle 9 small-stock 11

1: Each time a herd used one well is counted as 1 time of well utilization.
2: The position of wells is shown on Fig. 12.

and well owners coming from the same clan or sub-clan, and well owners and herd owners having some other type of relationship.

During these 50 days, the well owners' herds used the wells 84 times (43%), and herds that belonged to the people of the same sub-clan as the well owners used the wells 46 times (23%). Likewise, herds that belonged to people who lived in a different settlement but had an affinal relationship with the well owners used the wells 24 times (12%), herds that belonged to the people who were from the same lineage of the well owners used the wells 19 times (10%), herds that belonged to the people who were living in another settlement but were from the same clan as the well owners used the wells 13 times (7%), and herds that belonged to people who had no relationship to the well owners used the wells 11 times (5%). Although the well owners' herds used the wells most often, they used them less than half of the total time (43%) during the observation periods. The next most frequent category of well users was people from the same clan as the well owners (40%). This group included people of the same sub-clan (23%), same lineage (10%), and same clan (7%) as the well owners. On the other hand, in comparison with well-**i** and **ii**, which belonged to a group of people and were mainly used by the owners' herds, both well-**iii** and **iv** had only two owners and their wells were used by people from more extended relationships.

Before wells were dug in Rendille land, there was no significant evidence of any individual ownership of natural resources. From this perspective, the personal ownership of wells can be recognized as a new form of ownership of natural resources. However, based on an analysis of well usage patterns, ownership of the wells did not correlate with ownership of the herds that used the wells. In other words, wells were used by their owners and by people who had relationships with the owners.

VI. Household Labor Management in Relation to Cattle Raising

Compared with the Rendille's pastoral subsistence of the 1970s-80s, current subsistence are more complex. Ideally, people will manage livestock herding camps in order to maintain their livestock-based economy, but they will also engage in a number of new economic activities, in response to the growth of the cash economy. Labor is an indispensable resource needed to achieve these goals, and studies focused on labor management will offer insights into the factors that have shaped these new activities. Given that raising cattle is one of the most important economic activities that the Rendille have engaged in, in recent years, I focus on labor management relative to raising cattle.

Five herds of cattle of the Tupcha clan's two settlements in Korr have been shown in Table 10. Three of them, referred to as the HE, DL, and GG herds, were chosen for study.

Fig. 46 illustrates the relationships between the owners of each cattle herd. The herd known as HE belongs to seven households; five of them are shown in Fig. 46-a. Since the other two households are HE's younger brothers'

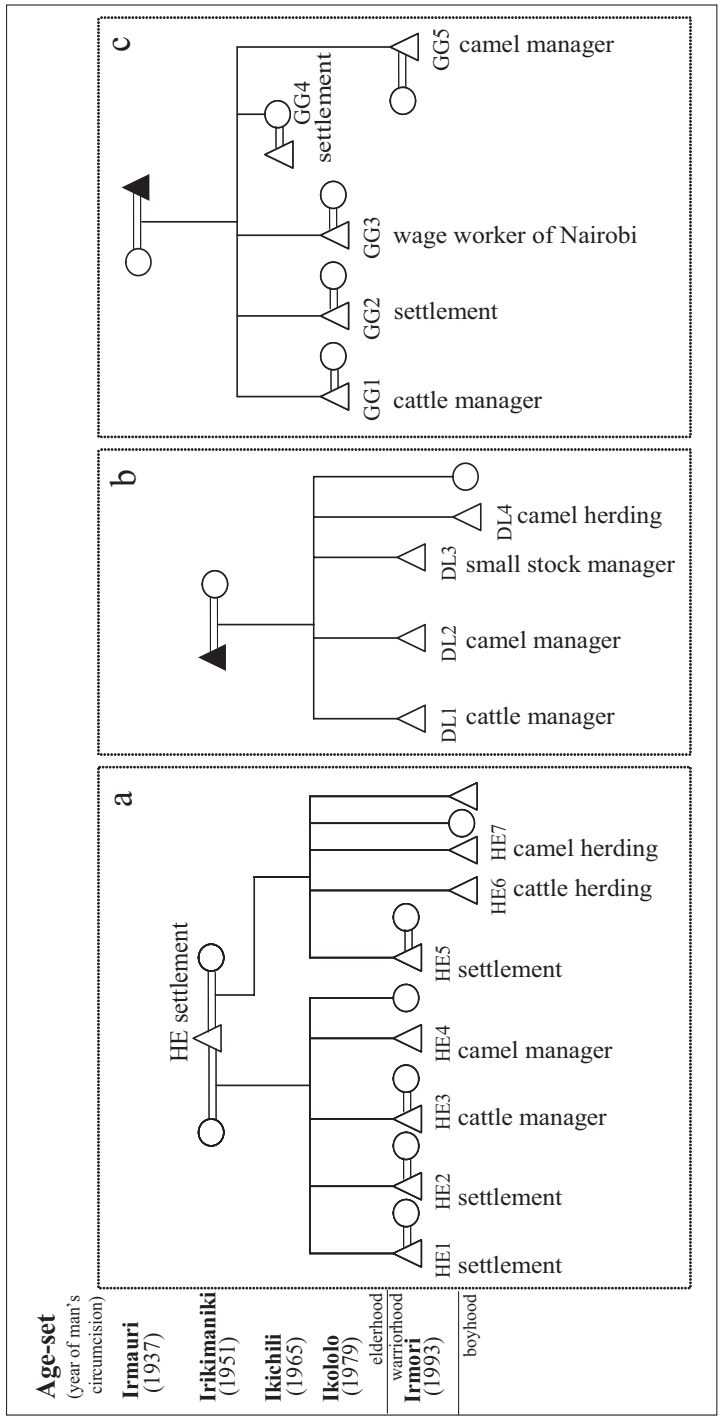


Fig. 46. Kinship diagram and labor management among cattle raising households.

households, which have very few cattle, I considered this herd to have five owners. HE is an elder of the Irikimaniki age-set, who has two wives and ten children, not including married daughters who have left. Of his remaining children, five are young men of the Irmori age-set of warriorhood, and four of them have married, so each married man counts as one household. Two sons, HE1 and HE2, live in the same settlement as their father, while HE3 and HE5 live in their wives' settlements. The camels of these five households are kept together, but the herd includes not only their camels but also other camels from other households of the same lineage. Currently, HE4 is in charge of this camel herd and his younger brother HE7 herds the camels each day. In 2003, HE3 managed the cattle herd, and a young boy, HE6, herded the animals each day. HE and his two sons, HE1 and HE2, live in the settlement, and HE1 and HE2 have dug a well near the settlement.

According to HE3, before he and his four brothers were circumcised in 1993, the herd had only 40 cattle, and the eldest brother, HE1, managed the herd. HE4, who was still a small boy at that time, herded the cattle each day. On the other hand, HE2 managed the camel herd, and HE3 herded the camels each day. In fact, HE5 is HE's second wife's first born, and he was employed as herder of another camel herd in the same settlement during his boyhood. After these five brothers were circumcised and became warriors, HE1 went to the small stock camp and HE3 took over the cattle camp, and let his younger brother HE6 herd the cattle each day. While HE2 continued to manage the camel herd, his younger brother HE4 shifted from cattle camp to herding camels. When HE2 got married and returned to the settlement, HE4 stopped herding the camels and became a manager, and asked the young boy HE7 to take over the daily camel herding. HE3 reported that, over the last 10 years, he had succeeded in increasing the herd to 93 cattle.

Two features stand out from the observation of the labor management of these households. The first is that if a household has many young boys or young men of the same generation, it is relatively easy for the household to manage its labor demands among the herding camps of different livestock species. The second is that when brothers of the same household grow up, they may follow a progression of duties from daily herding of camels or cattle to camel herd management, and then move on to the cattle herd management position before they get married.

Cattle herd DL belongs to only one household; Fig. 46-b illustrates the relationships among members of this household. The household consists of one mother, three warriors, one young boy and one girl. Camels of this household join a herd formed from camels that belong to other households of the same lineage. DL2 manages this camel herd, and his younger brother DL4 herds the camels each day. DL1 manages the cattle herd and carries out the daily cattle herding by himself, and DL3 manages this household's small stock herd. Same as in the case of herd HE, several young men belonging to the same household divide the labor demands associated with herding. However, unlike households of the HE group, whose warriors had married and formed their own

households, no warrior of the DL household married in 2003. According to DL1, the manager of the cattle herd, his household had only six cattle in 1993, but this number has increased to 27 over the last ten years.

Cattle herd GG belongs to nine households. Six households own most of the cattle are shown in Fig. 46-c; the rest have only 1-2 cattle per household. In contrast to the previous two examples, in which the members of households were mainly warriors, the GG herd's owners are one old mother, one married man of the Ikichili age-set, three married men from the Ikololo age-set, and one warrior. These households keep one herd of camels, which is managed by warrior GG5; the daily herder is a young boy hired from the same clan. The cattle herd is managed by GG1, and one of GG4's sons herds the cattle each day. GG2 lives in a house in his wife's settlement most of the time. GG3 works in Nairobi as a watchman. GG4 and her husband live in the Galale settlement, and it is GG4's daughter who is in charge of GG1's and GG4's small stock. GG1 is regarded as a hard-worker compared with other Rendille men, who tend to remain in the settlements. He worked in Nairobi and was the first person to participate in digging wells near the settlement. This example also suggests that labor management is important for the development of new activities. On the other hand, personal experiences outside the settlement, such as those of GG1, may encourage new activities.

SUMMARY: CURRENT PASTORAL SUBSISTENCE

The growth of towns, implementation of development projects, and recent sedentarization of pastoral settlements near developing towns have strongly impacted the Rendille's subsistence during the past 2-3 decades. Compared with their pastoral subsistence practices during the 1970s-80s, current subsistence constitutes a more complex system; people are attempting to manage herding camps in order to maintain their livestock-based economy, but they are also attempting to utilize new economic opportunities in response to sedentarization and the growing cash economy. Fig. 47 illustrates conceptual models of Rendille residential patterns in the 1970s and today.

By reviewing subsistence in the 1970s (Fig. 47 left), we can see that the seasonal fission and fusion of settlements and herding camps constituted a principal residential pattern. Just as Sato reported during his 15 months' observation, the camels returned to the settlement for 5.5 months (37% of the time), and the seasonal movements of settlements took 1-2 days, and covered a distance of 15-40 km (Sato, 1980). This residential pattern directly contributed to the consumption of livestock products as well as to the recruitment of manpower for pastoral activities in response to resource scarcity and environmental uncertainty.

However, as shown on the right side of Fig. 47, after the pastoral settlements moved closer to the permanent towns, livestock were managed in remote herding camps throughout the year. This has been the most marked change

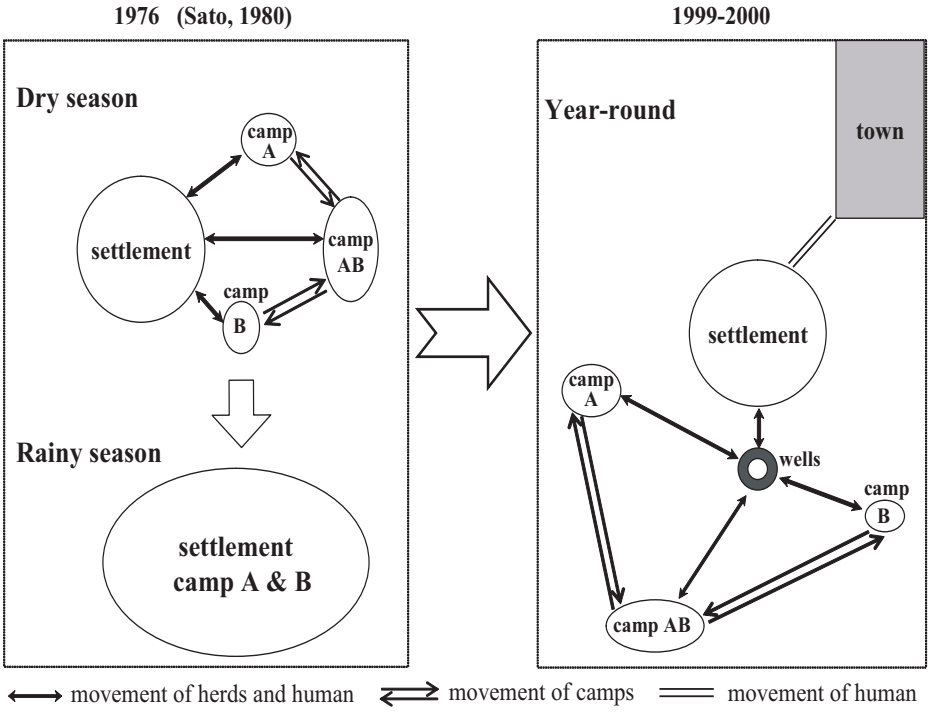


Fig. 47. Change of the seasonal fission and fusion between settlement and camps.

among the Rendille during last 2-3 decades. To illustrate the Rendille's current pastoral subsistence under this new situation, I analyze and describe interactions between four areas: the settlement, herding camps, wells, and the town (Fig. 47 right).

I. Settlement: The Political and Social Center

Rendille settlements near a town have been recognized as political and social centers not only for maintaining cooperative relations among households but also for adjusting to local socio-economic changes in Rendille land.

First, the way people live together shows the social relationships that pertain among that group of people. As mentioned in the second section, although the total population of the Tupcha clan has grown to almost twice its original size, the features of settlements composed of the same clan members have remained unchanged, and five small-scale settlements in 1976 have been re-constructed into three large settlements during the last 24 years. Thus, keeping a large-scale settlement contributes to strengthening clanship. Furthermore, cooperative relationships such as the subsistence unit have been developed and maintained among households of the same settlement.

Second, division between a settlement and herding camps is a strategy that not only improves the mobility of livestock herds in response to the scarcity of natural resources and unpredictability of the climate, but also allows for labor specialization. In the Galale settlement's case, 56% of married men, 95% of married women, and 93% of infant boys and girls live in the settlement, in contrast to 94% of warriors and more than 60% of young boys and girls who live in herding camps. Therefore, sex, age and marriage distinctions determine the distribution of labor in pastoral production activities. Furthermore, the settlement is a place for married men and women to maintain their social lives as well as to rear children.

Third, the communal place, the *nabo*, is considered to be symbolic of the settlement's position as a political and social center, not simply because it is built at the center of each settlement, but because it is used as a place to hold meetings and ritual ceremonies of the whole settlement. Restrictions that prevent women and unmarried men from entering the area highlight its importance. Thus, the existing structure of a settlement reflects the settlement's social position.

However, in contrast to the political and social activities within Rendille society, the economic situation of the settlement, as it relates to the local economic system, has become complicated. People are gradually becoming dependent on the food that comes from the town. Compared with the seasonal fission and fusion of settlements and camps 20 years ago (Sato, 1980), people have less access to livestock products. Nonetheless, the people in settlements seek new opportunities to obtain milk, such as watering camels at wells near the settlements during the long dry season (mentioned in the third section). On the other hand, as a response to the growing cash economy, more married men from the settlements have attempted to work as migrant workers in cities outside of Rendille land.

II. Herding Camps: Pastoral Production Activities and Pastoral Adaptive Strategies in Practice

Pastoral production activities are mainly performed in herding camps; indeed, it is there that pastoral adaptive strategies have been practiced and developed.

1. *Camel Camp*

Camel herds are based on subsistence units, the most representative cooperative relationship for livestock management among the Rendille households. A herding camp includes all camel herds belonging to the same clan or sub-clan.

The high percentage of female camels among the Tupcha's herd confirms that people are still maintaining camels for their pastoral subsistence, since an adult female animal is indicative of self-sufficiency owing to its supply of milk and its reproductive ability. Furthermore, the fact that the Tupcha still keep many camels demonstrates their ability to preserve their livestock in the face

of damage caused by natural hazards. Some new technological adjustments with respect to herding camels include the formation of "infant exchange herding" and the division of camps for watering during camel delivery seasons. The camel camps' current movement patterns reflect natural environmental factors and social factors; as compared with the sedentarization of the settlement, camel herds move frequently, over a wider range. These features illustrate the Rendille's flexibility and ingenuity as it relates to the herding and management of camels.

The camel camp is the only self-sufficient unit, in which members rely exclusively on livestock products, among the settlements and various other types of camp. A distinctive feature of camel camps is the impartial distribution of food at the communal place, which ignores differences in the numbers of milking camels among herds and reinforces solidarity among camp members. Moreover, changes in the human population of camel camps between dry seasons and rainy seasons illustrate a continuous adaptive strategy with respect to the consumption of camel products.

2. *Cattle Camp*

Cattle raising is a new activity in Rendille land, as shown both by the growth in cattle numbers and by interviews with local people. For example, Fratkin (1993) reported an average of 2.6 cattle per household in 1989; in 2003, an average of 10.5 cattle per household has been observed.

People tend to sell cattle when they need money. Unlike camels, which are raised by most of the Rendille households, household's participation in cattle raising varies, and the relationship of owners whose cattle belong to the same herd is not considered the basis for a subsistence unit. Furthermore, the relationship among members of a cattle camp varies, and those members are not related by clanship.

Although rearing cattle has been considered non-adaptive to the uncertain natural environment and scarcity of grasses in Rendille land, the Rendille do not think of nature as a whole. Instead, they link the detailed diversity of vegetation to both spatial and seasonal changes, and they adjust cattle herding strategies to these variations in natural resources. In addition, through digging wells, they have expanded their opportunities for raising cattle. In contrast to camel herds, which keep to the lowlands but move frequently throughout that region, cattle herds use certain spots close to water resources; these resources, however, are scattered across a much wider region. Thus cattle raising reflects the Rendille's abundant knowledge of adaptive livestock herding strategies to an uncertain environment.

3. *Small Stock Camp*

Unlike camel or cattle herds, which are mainly formed by animals from several households, animals from only one or two households form herds of small stock. Although small stock camps may be set up with very few herds, people prefer to set up camps with other herds from the same settlement.

Skillful management is practiced in small stock camps; for instance, keeping some camels in small stock camps during the long dry season is considered valuable in order to prevent malnutrition of herders. The high reproductive ability of small stock animals allows people to recover their livestock quickly after natural hazards, and to use small stock frequently for meat consumption, and to sell them for cash. Furthermore, exchanging small stock for cattle with neighboring cattle herders has allowed the Rendille to build their cattle herds in recent years.

III. Wells: Connecting Settlements and Camps

The emergence of well-digging has greatly changed the Rendille's herding patterns, especially with respect to cattle and small stock. People who own the wells can easily water their animals and keep part of their herds near the settlement; those who do not have wells can also borrow water from well owners for this purpose. Commonly, if a well has water but no herd is using it, the owner may not refuse a request for water from someone in need.

Wells are seen as a new connection between settlements and livestock camps. As mentioned in the third section, the well allows people in settlements to consume milk from the camels that pass through during the long dry season and visit the wells for water. Moreover, wells also make it possible to raise cattle in the central lowlands, because cattle must be watered every 2-3 days throughout the year. Thus, the recent boom in the digging of wells could be a positive sign, indicative of an improvement in people's lives.

IV. Towns: Centers for the Local Economy and Windows to the World Outside

Given that more than 20 permanent shops are located in Korr, and more than 50 settlements exist near the town today, the local economy has grown quickly, and the town is regarded as the center of the local economy. Contact between people in the towns and settlements has become frequent, and the "credit system" has linked shops and the people of the settlements more closely.

The distribution of relief food by missions and development agencies from the town has attracted people from the settlements. As food is carried to settlements from the town by manpower alone, the women who carry the food might have difficulty transporting it if a settlement is far away from the town. Thus, relief food supports the Rendille livelihood during droughts, and it also has influenced the sedentarization of settlements.

The town, located in the central lowlands, is a window to the outside world for the Rendille, and a window on the Rendille for the outside world. Development project managers and missionaries have built their bases and started their activities at Korr, and people from settlements came to the town not only to buy food and goods but to seek new economic opportunities. Moreover, when people living in the central lowlands of Rendille land want to travel afar, they must go to the town to find transportation.

V. Current Pastoral Subsistence

As mentioned above, the pastoral subsistence of the Rendille today does not constitute a closed, self-sufficient system, but is a comprehensive system, including both pastoral production and associations with the local economic system. The pastoral production system consists of the political and social centers offered by the settlements and the pastoral production sector of the livestock herding camps. Its place in the local economy is reflected, mainly, by contacts with the town.

Within the pastoral production system, the camel camp is the only unit that maintains self-sufficiency, and is undoubtedly the most stable economic unit in an uncertain environment. Furthermore, important principles of, and cooperative relations within, Rendille society, namely clanship and subsistence units, are reflected in the formation and management of camel camps. In contrast, the cattle camp is the most unstable unit; this is due to the inadaptability of cattle to scarce rainfall and to an unpredictable environment. However, raising cattle is apparently the most viable new economic activity by which people can respond to the growth of a cash economy. Not every household is raising cattle, but those that are, are those that can arrange laborers to herd cattle or those that hold large numbers of small stock to exchange for cattle. Meanwhile, the small stock camp seems to be the most independent unit, since a single household can raise one herd of small stock and build its own camp. Small stock animals are the most common choice for both meat consumption and for exchange. Finally, the interaction between the settlements and these herding camps must be emphasized in that the cooperative relationships contribute to the management of livestock herds and camps, and the production activities of herding camps secure and improve the livelihood of the settlement. In addition, the wells that have been dug in recent years, have functioned as a kind of connector between settlements and herding camps, and have increased the opportunities for raising cattle in the arid lowlands.

Perhaps the most significant relationship between the pastoral production system and the local economic system is the "credit system," which offers people of the settlement opportunities to buy food and goods, even without cash in hand. However, it is the livestock held by people in the settlement that allows this system to work and continue. As the case described in the fourth section illustrated, during the severe drought in 2000, people of the Tupcha settlement had no choice but to sell their camels in order to repay their credit. Therefore, the basic livelihood of the Rendille today is dependent on livestock production both directly and indirectly.

In addition to altering the basic livelihood of the people, the growing cash economy between settlements and towns has underscored the value of cattle. As most warriors emphasized, without selling cattle, they could not pay for their wedding ceremonies. The remittance from migrant workers in big cities has partly solved the cash demand problems of people in settlements, although it has also promoted the cash economy in Rendille land.

DISCUSSION: DYNAMICS OF CONTINUITY AND CHANGE IN PASTORAL SUBSISTENCE

Two important relationships have been examined in this study with respect to the dynamics of continuity and change in pastoral subsistence. One is that the flexibility of, and improvement in, the Rendille livestock management and pastoral strategies have contributed to the continuity of the pastoral production system. The other is that the diversification of household economies is implicated in the dynamics of current pastoral subsistence.

This paper has described several aspects of the flexibility of, and improvement in, livestock management and pastoral strategies.

First, the communal use of land and water gives the Rendille an advantage in maintaining their pastoral activities, since these activities require high mobility. As mentioned in the second section, with the exception of the Marsabit National Park and farms located atop Mt. Marsabit, all areas of Rendille land are still treated as communal lands. The Koralle Spring, which is the only permanent surface water resource for livestock in Rendille land, is shared. Furthermore, as mentioned in the fourth section, the shallow wells dug by individuals in recent years are used among people with extended relationships to the owners.

Second, although the Rendille have built their settlements near the developing towns, they have successfully maintained a high mobility for livestock by maintaining the movements of herding camps and practicing opportunistic management in relation to natural resources. As described in the third section, specializing herding tasks in camps helps to maintain a high degree of mobility for the livestock, even after the sedentarization of the pastoral settlements near the town. Fig. 48 illustrates the positions of the Tupcha's livestock herding camps that were observed between 1999 and 2003. Contrary to the settlements close to Korr, herding camps for these people were scattered over a wide range, in some cases more than 70 km from the settlement (such as Camp 1 and Camp 10). This illustration of Tupcha's scattered herding camps suggests that the pastoralists themselves know best how to manage their livestock in their environment, and if the access to natural resources is not restricted, they will be able to maintain the high mobility of their livestock. This scenario offers a contrast to the simplified model of desertification, which supposes that the sedentarization of pastoralists would attract both people and a greater number of livestock to a limited area and cause the degradation of vegetation and soil in the region (Republic of Kenya, 1991).

Third, maintaining important social institutions has enabled people to reorganize the "set" of settlements and herding camps, and to form cooperative relationships that facilitate herding tasks and the continuity of their daily lives. As mentioned in the third section, although the population of the Rendille has nearly doubled during the last two decades, their social institutions, especially the clanship and age systems, have remained as principal guidelines in the formation of settlements and herding camps, and in the distribution and management of labor in the pastoral production system. The large-sized clan

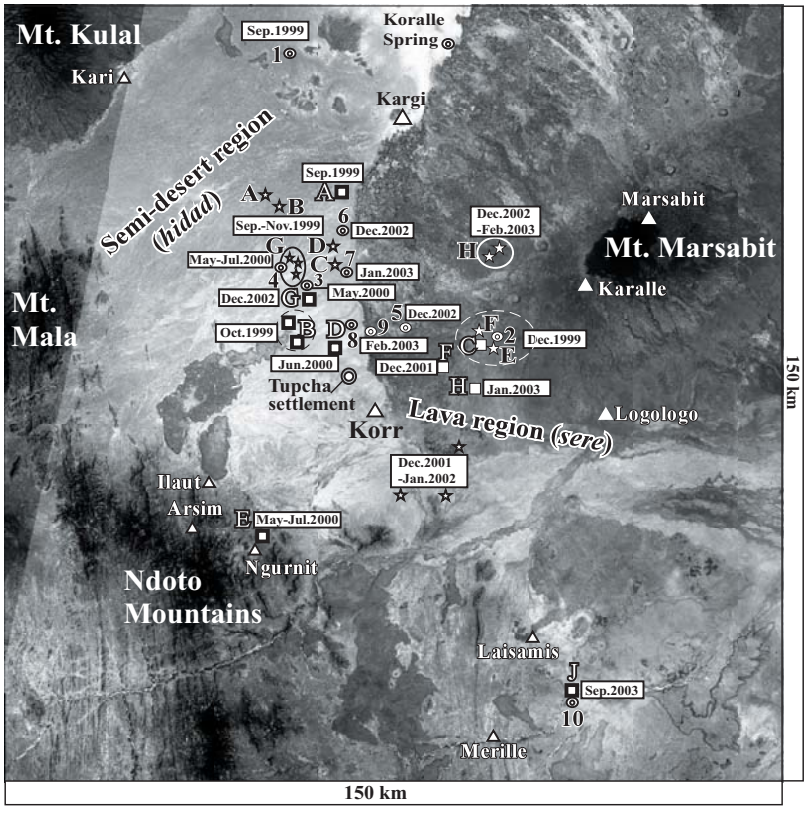


Fig. 48. Position of Tupcha settlement and livestock herding camps.

settlements and clanship-based camel herding camps, the subsistence units, and the division of labor by sex and age, all result from social institutions. The manifestations of these strong social relationships appear in their daily activities. For example, the impartial distribution of livestock products at the communal place in camel herding camps eliminates differences in milk yield among different herds in the same camp, and reinforces solidarity among camp members.

Fourth, the Rendille themselves have tried to improve their herding skills and their use of new natural resources. Their new method of forming groups for the daily herding of camels in response to the labor shortage is an example of such a development of their herding skills (noted in the third section). The current practices of well-digging, cattle raising, and the use of new range land (such as the region where cattle camp-10 and small stock camp-J located in Fig. 48), are all examples of the people's recent efforts to made use of natural resources in a new way.

Consequently, by continuing the custom of communal land and water use,

reorganizing the "set" of settlements and herding camps, specializing herding tasks in camps, maintaining livestock mobility, and maintaining important social institutions, the Rendille have demonstrated their ability to manage their pastoral production system within the current changing socio-economic environment, i.e., the practices described illustrate the continuity of pastoral subsistence today.

The second major relationship examined in this study is that of the diversification of household economies to the dynamics of pastoral subsistence.

In recent years, researchers and development project managers have suggested that pastoralists in East Africa are pursuing non-pastoral income strategies, such as trading (selling milk, firewood, or other products), wage employment, and farming in order to improve their quality of life. These strategies have been described as part of the diversification of pastoral subsistence. For example, the combination of small scale cultivation with cattle herding carried out by the Maasai in the Ngorongoro region of northern Tanzania has been recognized as a successful strategy for coping with food shortages during drought periods (McCabe *et al*., 1997); an involvement in the market has also improved the economic position of the Maasai in the Kajiado District of southern Kenya (Zaal & Dietz, 1999).

The sedentarization of pastoral settlements near the developing towns have provided the Rendille with the convenience of public services, such as hospitals and schools; at the same time, it has promoted economic activity between settlements and towns, and increased the people's need for cash in their daily lives. In recent years, raising cattle has become the most effective strategy for responding to the cash economy inside Rendille land, while wage employment, such as working as a migrant worker, offers an alternative strategy for earning money outside of the Rendille land.

As described in the third section, cattle products alone cannot support a herder's daily life; furthermore, an unpredictable environment has led to the Rendille's cattle having to move in a wide region for pasture and water. Nevertheless, the number of cattle per household has increased fourfold during the last two decades. Cattle are sold frequently at the market when people need money. Moreover, as mentioned in the fourth section, even the high value placed on camels remains; the fact that warriors cannot fund their wedding ceremonies without selling cattle, and the saying, "A cow has four breasts, just as a camel does, so they are equal to each other," reveals the increasing importance of cattle. Today, the difference in value between camels and cattle is that camels support the self-sufficiency of a household economy, whereas cattle provide opportunities to respond to the growing cash economy in Rendille land.

As noted in the fourth section, the remittance from migrant workers in Nairobi has influenced the repayment of credit for households in settlements, and makes it possible for a household to repay its credit regularly. Some migrant workers also try to save money to buy livestock. During interviews with warriors of herding camps, most of them showed an interest in working outside the area, even as they agreed that, as warriors, they have responsibilities to manage their livestock and serve as leaders in herding camps. As one

warrior told me, “The camel herd that I manage comes from mine, my father’s, my elder brother’s, and my uncles’ camels, but I am not sure whether someone will give me animals when I get married. But if I can work outside (as a wage worker), I may have a chance to save money and buy myself animals….” In recent years, with the development of livestock markets, some Rendille have taken advantage of livestock trading and bought female animals in order to develop their own herds.

In conclusion, in order to respond to the changing socio-economic environment, especially the growing cash economy, the Rendille are learning to diversify their household economies, which combine both cattle rearing and wage work with the traditional camel herding. The process of combining challenging new economic activities and developing pastoral production systems illustrate the dynamics of pastoral subsistence today.

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NOTES

(1) The main fieldwork was done around Korr town (see Fig. 1), but rainfall data for Korr has not been collected since 1993. Laisamis town was chosen because its altitude and vegetation zones are similar to those of Korr.
(2) Although Korr has grown up as one of the biggest population centers in Marsabit District, its name cannot be found from current Kenya Atlas. Therefore, the position of the Halisurwa Hill indicated on general maps is used as a landmark for Korr town (see Fig. 1).
(3) *Goorat maati ani her tekh, goob weyti guurte. Maanti Kulal waakh a deye, goob guurte. Maanti Haldaayan waakh a deye, goob Haldaayan guurte. Toora, taun gele, hoola kaldach guure.*
(4) The classification is referred to in Sato (1980: 44).
(5) Shade from the trees is important for camels, allowing them escape from the extremely hot sunshine in mid afternoon.
(6) Since water seeps through the bedrock of the well slowly, if the water was completely taken out of the well, it would take at least one day to reach the same level as before, as measured by author.
(7) 1993 was the year that the Irmori age-set held the circumcision ceremony, which meant that most people remembered that year.
(8) *Gaal nahas affar habta, lolyo laka affar habta, icho ekkaa*.

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