# Longitudinal and Comparative Study in Search of Continuity and Potential in Pastoral Subsistence of East Africa

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**Abstract**

Nomadic pastoralists of East Africa have rapidly changed due to both increasing natural hazards and socio-economic changes in the 20th century. This paper first reveals the reality of current pastoral subsistence by examining how the livelihood strategies operate currently and what has continued or changed over time, and then discusses the continuity and potentiality from the implications of local practice for future development. A comprehensive approach combining field observations with a longitudinal and comparative study on the Rendille pastoralists of northern Kenya was attempted. The results show that the Rendille have changed from nomadic to semi-nomadic under the influence of development projects and relief efforts in the past three to four decades. However, by continuing communal use of rangeland and water resources, setting high value on livestock and maintaining high mobility of livestock at herding camps, adapting social institutions such as age system and cooperative relationship in herding tasks, they have achieved certain success in maintaining pastoral subsistence. On the other hand, challenging new opportunities, such as developing new wells and raising more cattle assisted people in responding to macro socio-economic changes. Although the Rendille livelihood has changed from a relatively closed and self-sufficient system to a complicated local system, the results of longitudinal and comparative studies show that they are in the process of creating new livelihood strategies, which not only have the ability to maintain livestock herding, but also are capable of responding to profitable opportunities brought from outside.

**Key words**: Sedentarization; Livestock management; Mobility; New opportunities; Rendille

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## Introduction

The nomadic pastoralism of East Africa has become a major subject in both anthropological research and development projects in the 20th century. Some early ethnographies, such as Evans-Pritchard's (1940) classic book, *The Nuer*, presented a detailed description of pastoral subsistence from ecological, political and cultural perspectives. Studies in the 1960s to the 1980s revealed pastoralists' adaptation strategies to the natural environment, and considered nomadic pastoralism as the optimal subsistence in arid areas of Africa (e.g., Dahl and Hjort 1976; Sato 1980; McCabe 1985). From the late 1970s, with the increase in relief and development projects implemented by both international agencies and national governments, numerous studies began to focus on the change in traditional pastoral societies. The keywords used to describe pastoralists then changed to environmental degradation, rangeland privatisation, sedentarisation, com-

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moditisation and increased social and economic differentiation. Although many of these studies attempted to seek possible solutions and suggestions for policy making and development, the overall assessment of the continuity of nomadic pastoralism was pessimistic (e.g., Dyson-Hudson, 1985; Baxter and Hogg 1990; Spencer, 1998).

Nevertheless, in the arid and semi-arid areas of East Africa today, the majority of pastoral societies remain committed to raising livestock. Even as some have adopted sedentarisation and new economic activities, livestock based economy supports a large number of population and provides great opportunities of employment and income in the rural area. Considering this complicated situation, this paper first reveals the reality of current pastoral subsistence by examining how the livelihood strategies of pastoralists operate currently and what has continued or changed over time, and then discusses the continuity and potentiality of pastoral subsistence from the implications of local practice for future development. A comprehensive approach combining field observations with a longitudinal and comparative study was attempted. The fieldwork studied the Rendille pastoralists of northern Kenya, who Japanese researchers have been studying since the 1970s. The analysis of current pastoral subsistence is based primarily on my 23 months of fieldwork conducted with the T clan settlements between 1998 and 2007. To improve the precision of the comparison, the same research site where Sato (1980) conducted his noted ecological and anthropological research in the 1970s was chosen.

**Adapting to Sedentarization**

The Rendille inhabit one of the driest places in Kenya, an area consisting of bushland and semi-desert grassland, with an annual rainfall of less than 200 mm. The region is characterised as a "non-equilibrium ecosystem", which plant growth is limited by unpredictable rainfall and frequent droughts, and requires high mobility and flexibility in livestock management (Ellis & Swift 1988). For centuries, by raising multiple species of livestock (mainly camels, goats and sheep), and moving frequently in response to both natural and social environmental uncertainty, the Rendille maintained subsistence pastoralism, relying on both livestock products and the exchange of livestock for agricultural products with neighbouring farmers and merchants. Their population numbered approximately 27,000 in 1989 (Spencer 1973, 1998; Sato 1980, 1992; Schlee 1989; Republic of Kenya 1994).

The political and economic situations in northern Kenya have changed rapidly in the past three to four decades. Following a severe drought from 1982 to 1984, global famine relief efforts triggered development projects by both international development agencies and national governments (Fratkin 1991). On Rendille land, fast-growing towns materialised inside their range area as centres for relief and development projects. Before these towns began, the Rendille settlements were widespread and moved frequently throughout the region. Under the influence of the development projects and drought-relief efforts, most settlements moved into vicinities of the new towns. The Korr town, located in the centre of Rendille land has grown up from a water point to the biggest population centre, with more than 20 permanent shops in town and more than 50 settlements exist near the town. In 2000, the population of Korr region were approximately 14,500, including about 2,500 people inside the town and about 12,000 people in settlements near the town. Such kind of change in residential pattern is one of the biggest transformations to occur not only in Rendille society but also among most pastoral societies of East Africa in the 20$^{th}$ century (Sun 2004, 2005; Fratkin & Roth 2005).

Like many other pastoral societies of East Africa, the Rendille have traditionally employed a dual residential system, consisting of settlements (*goob*) and herding camps (*foor*). Basically, people from the same clan establish their own settlements, while herding camps

are built for each livestock species in accordance with their different biological adaptability to the environment. According to Sato's study, when dry season advances, married people with young children were left behind in the settlement, while the herders took animals away in search of better pastures. After the rains fell, herding camps and settlement joined together into the same area where fresh pastures and waters were available. Such seasonal movement of settlements took one to two days and typically covered a distance of 15-40 km (Sato, 1980). This practice is considered to be the most important adaptation strategy, enabling people to cope with the scarcity of resources and environmental uncertainty. However, such seasonal fission and fusion of settlement and camps was no longer practiced due to the sedentarization of settlements near developing towns.

The positions of the T clan settlement and livestock herding camps between 1998 and 2003, shown in Figure 1, are based on data collected using a global positioning system (GPS). During this period, the settlement had not moved far from the town of Korr, but herding camps moved frequently and covered a large area. Among these camps, camel camps were situated mainly in the semi-desert region, while cattle camps and goat and sheep camps were situated both in semi-desert and lava areas. In periods of drought, cattle camps as well as goat and sheep camps moved significant distances from the settlement to access good pasture and water conditions, sometimes as far as 80 km (e.g., Camp-1, 10 and Camp-J). On the other hand, the average distance of camel herd traveled per day was 13.6 km in 1999-2000. Compared with Sato's (1980) report of 14.5 km per day, it is reasonable to think that high mobility of livestock has been remained. Therefore, the sedentarization of settlements near the town has neither centralized livestock into a limited area nor restricted their movements. The high mobility of livestock is maintained by separating settlement and herding camps and by keeping animals at camps. The Rendille provide many reasons for why they have to move their animals frequently, including ecological factors such as looking for good pasture and water and avoiding drought, and socio-economic factors for avoiding raids and conflicts, performing ritual ceremonies, and accessing to livestock markets (Sun, 2002).

**Local Technologies and Institutions Function in Pastoral Production System**

***Dynamics of the Number and Value of Livestock***: Raising multiple species of livestock and keeping maximum numbers of animals are both important adaptive strategies to the uncertain natural environment of East Africa. Pastoralists take advantage of the biological adaptabilities of different species and adjust their needs and uses to the quantity of livestock products for human consumption that are yielded by different species in different seasons. Large herds of livestock help pastoralists to maintain stable self-sufficiency as well as to absorb damages from unpredictable natural hazards (Dahl & Hjort, 1976; Sato, 1980; McCabe, 1985; Ohta, 1998). The Rendille have traditionally been camel and small stock herders (Spencer, 1973; Sato, 1980), but in recent years they have also begun raising cattle (Sun, 2004).

In 2000, the T clan had 32 camel herds; the average number of camels per herd was 50.2, with an average of 22.4 adult and adolescent female camels (44.7%). According to Sato's observation in 1976 (Sato, 1980), the T clan had 26 camel herds, and the average number per herd was 49.1 camels. Herd sizes were almost the same in these two years, but in 2000 the total number of herds for the clan had increased 1.2 times, from 26 herds to 32 herds. On the other hand, Sato reported that in 1976, the Rendille had an average of 14.9 camels per household, while in 1989, following a severe drought, Fratkin reported only 3.3 camels per household (Fratkin & Roth, 1990). In 2000, I counted the camels to be 9.5

per household. Therefore, camel population had partly recovered from the damage of droughts in 1980s.

In 2003, the T clan had 11 herds of cattle; the average number per herd was 73.2, with an average of 35.8 cows and heifers (48.9%). The average number of cattle per household was 10.5. According to Sato's study (1980), the T clan had little interest in keeping cattle during the 1970s. In 1989, Fratkin (1993) reported an average of 2.6 cattle per Rendille household. Compared with these data, numbers of cattle have obviously increased. Although raising cattle was a recent innovation, it has attained a degree of success. On the other hand, numbers of small stock have also increased, from 32 animals per household in 1989 to 102 per household in 2000.

This investigation and comparison revealed three important facts. First, since adult female animals are recognized as the basis of self-sufficiency in the pastoral production system, due to their ability to supply milk as well as their reproductive capabilities, the high average numbers of female camels and cattle within herds show the continuity of a livestock-based livelihood. Second, as livestock number often fluctuate due to unpredictable droughts, the dynamics of livestock numbers demonstrates the potential of the Rendille to recover from the damage of natural hazards. Third, a recent trend of raising cattle has attained a degree of success.

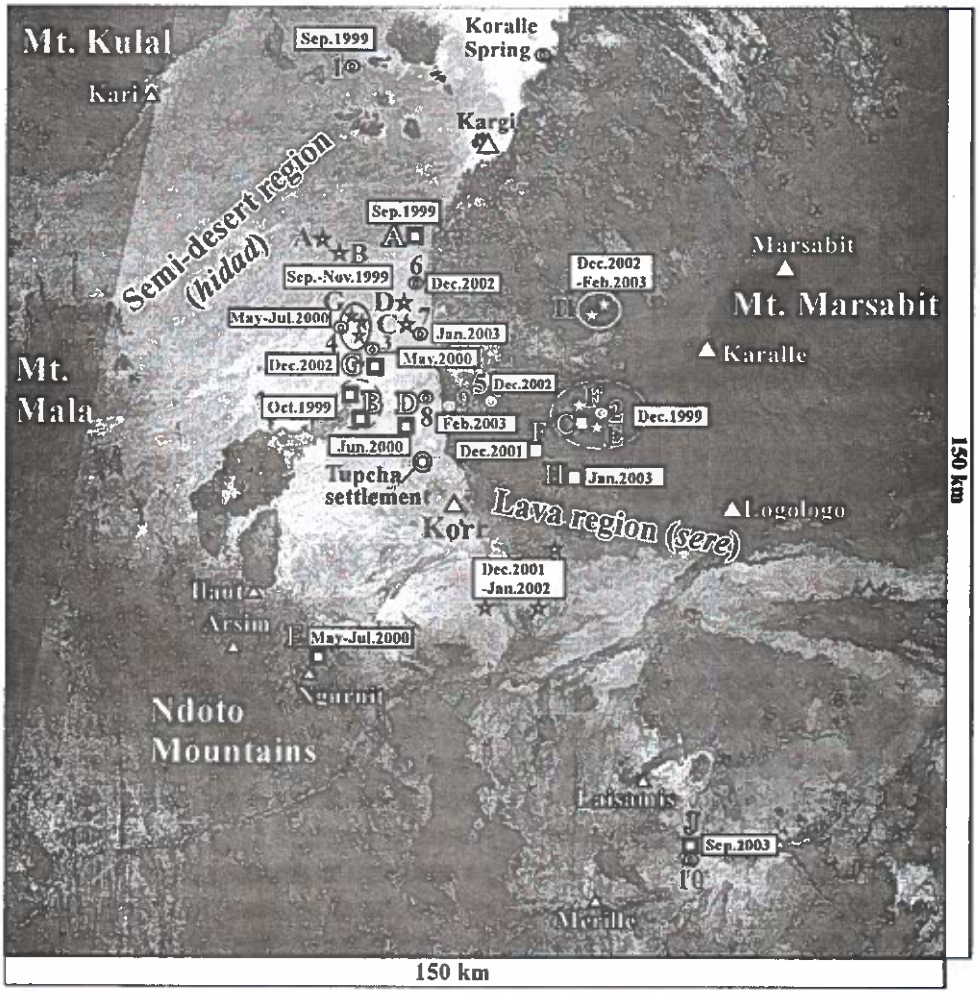


*Figure 1: Positions of T Clan Settlement and Herding Camps*

The Rendille have been recognized as camel herders for centuries; they view the camel as undoubtedly the toughest and most productive livestock in arid land. 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; within the traditional sacrificial ceremony, the *sorio*, held four times a year, three are reserved for camels, and all camel herds return to the settlements during the ceremonies Furthermore, among all livestock, only camels are branded with a clan or sub-clan's original brand, and only female camels are given a special name by which its owner's clan can be identified. This is also related to the camel "trust system (*maal*)," which reserves the ownership of female offspring camels for its original owner (Sato, 1992).

In contrast, 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. However, people strongly emphasized cattle's value in relation to its market value. Since animals traded at markets in towns 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, whereas the camel fetches a relatively low price at the market. Therefore, the difference in value between camels and cattle represent their functions in supporting Rendille pastoral subsistence. That is, camels secure the self-sufficient livelihood against environmental uncertainty, whereas cattle provide opportunities for responding to the growth of the cash economy in recent years.

***Distribution of Labor and Consumption of Livestock Products***: In East African pastoral societies, social institutions such as descent and age systems are regarded as the principal structures underlying livestock management practices. In Rendille society, despite the growth of population and sedentarization, people continue to establish settlements consisting of members from the same clan. Households in the same settlement develop and maintain cooperative relations that exist in both herding and other day-to-day activities. Livestock herding camps, especially camel camps, typically consist of all of the animals from a settlement.

The age system basically functions to establish social relations and manage livestock herding tasks. In Rendille society, male age-grades distinguish boyhood, warriorhood, and elderhood, while female age-grades mark girlhood and womanhood. A collective circumcision ceremony is held every 14 years. After this ceremony, boys are initiated into a new age-set to become warriors. At the same time, those young men of previous warriorhood age-sets get married and become elders. Girls are initiated into womanhood through marriage.

Generally, small boys and girls stay in the settlements with their parents. At the age of seven years old, they start herding small stock around the settlements or near herding camps. Boys of ten years old or older are sent to camel or cattle herding camps and girls of this age are sent to small stock camps. Young men of the warriorhood age-grade are in charge of camel or cattle camps and are regarded as a defensive force during periods of regional instability. Most married men and women live at the settlements, where married men are in charge of local politics and ritual matters, and women engage in housework (Spencer, 1973; Sato, 1980, 1992).

In 2000, the T clan settlement had a population of 282 people, including 177 (63%) living at the settlement and 96 (34%) occupying the herding camps. Out of 39 married men, 22 (56%) lived at the settlement, ten (25%) lived in small stock herding camps, and two (5%) resided in camel and cattle camps. In contrast, among a total of 60 mar-

ried women, 57 (95%) lived at the settlement. At this time, 16 young men belonged to the warriorhood, and 15 (94%) of them were in charge of the livestock herding camps. Thirty-one young boys (67%) and 32 young girls (64%) over seven years old lived in herding camps, whereas 66 infants (93%, boys and girls together less than seven years old) lived at the settlement. Therefore, the continuation of the age system and the practice of labor distribution through sex, age, and marriage made it possible for the Rendille to remain such livestock management strategies as the dual-residential system and high mobility illustrated in Figure 1.

Despite the sedentarization of settlements near the towns, herding camps frequently moved throughout a large area. Obviously, people living in settlements have less access to livestock products when compared to the previous residential pattern of seasonal fission and fusion of settlements and herding camps (Sato 1980). To solve this problem, people of settlements have improved seasonal fluctuation of human between settlements and herding camps.

Between September and December 1999, the T clan's camel herding camps moved six times (Camp A-F in Figure 1). I observed the construction of five camps, including three in the long dry season between September and November (Camp B, C, D) and two in the short rainy season in December (Camp E, F). During the dry season, 21-22 herds of T clan's camels joined together at camps set in the semi-desert grassland. The total populations of the three camps were 36, 43, and 40 people, respectively, and the average population per herd was 1.8 people. During the rainy seasons, these camel herds moved to the bushland near Mt. Marsabit. The two camps had total populations of 64 and 67, with an average of 3.1 people per herd. People explained to me that during the dry season, the volume of camels' milk is low, and they have to move a long distance to the water point every 10 to 14 days; thus, only herders are able to remain at the camp. In contrast, during the rainy season, when milk production is abundant and camels do not need to travel long distances for water, many people are able to live at the camps and rely on livestock for subsistence. Among 50 boys living in a rainy season camp, 28 boys (56%), at under seven years of age, were too young for herding tasks and just stayed for the milk.

**Challenging New Opportunities**

***Developing New Water Resources***: Although many factors affect the mobility of livestock, I observed that water availability causes the highest frequency of herding camp movement. According to the Rendille, camels can survive without water for two weeks, while small stock must be watered every three to four days during the dry seasons. Both camel and small stock are not watered in rainy season, because browse and grasses they consuming may absorb considerable quantities of water and supply enough moisture for them. However, cattle have to be watered every two to three days year-round. Since the only permanent surface water, Koralle Spring, is located far north of the central lowland where most Rendille have settled (Figure 1), only camels can travel to the spring for water. Cattle as well as goats and sheep use wells near settlements or towns. Most of these wells were dug in recent years as part of development projects.

In the 1970s and 1980s, water resource development was recommended as key to the success of development projects in East Africa's arid and semi-arid areas (Republic of Kenya, 1991). In Rendille land, geographic surveys of water veins, sponsored by Germany's Agency for Technical Cooperation (GTZ) and other international donors, were conducted along some big wadis, and several shallow wells were dug by the Rendille under the guidance of experts associated with development projects. However, in the 1980s, when global environmental problems began to attract much more atten-

tion than local development plans, water resource development came to be criticized for causing desertification. In Rendille land in the early 1990s, water resource development projects were gradually neglected and later disbanded. However, the Rendille, who had learned well-digging skills as well as the places where groundwater was likely to be found, began to dig wells by themselves.

In 2001, 34 wells were either complete or under construction within a 500 m area along a wadi near T clan and the S clan settlements. Of these, 20 were used for watering animals, while the rest were still works in progress. In 1998 when I first stayed at the T clan settlement, there were only two wells; but by 2001, they had increased their number of wells to ten. Both individuals and groups of people owned the wells, either the people who actually dug the well, or those who had financed the digging.

Digging wells in the central lowland is hard, time-consuming work. Tools are limited to hammers and iron sticks, and the bedrock under the wadi is thick and hard. Normally, it takes two to three months to dig a well. Despite these difficulties, over the last few years, well digging has become a booming business in the Korr area. This has important implications for sedentarization. As most settlements are near towns, wells are very convenient for daily use by many people. In addition, the location of wells, near permanent settlements, makes it easier for the owners to maintain and manage them. Furthermore, I found that people were trying to organize their animals at camps so they could be watered at these new wells. As illustrated in Figure 1, despite the sedentarization of settlements, livestock herding camps have continued to move frequently throughout a large area. Although this separation between settlement and camps has meant less access to livestock products for people at the settlements, herders tended to pass their animals through settlements before or after they watered their animals at the new wells. This arrangement has both helped people at the settlements gain livestock products and strengthened the relationship between settlements and herding camps. Moreover, since cattle must be watered every 2-3 days year-round, it would be impossible to raise cattle in the semi-desert grasslands without these wells.

***Interaction between Settlements and 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. 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 town every 3-4 days.

People in settlements buy not only staple food such as maize, but also other 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.

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 by maintaining strong relationships with members of the settlements, they believed that debts would be repaid.

In recent years, with the development of the transportation system, some Rendille have left Rendille land and become wage-workers in Nairobi or other cities of southern Kenya. Since most wageworkers are married men who have families living in settlements, the money they send back to their families may solve their daily cash demand problems, but also has the consequence of accelerating the cash economy in Rendille land.

Though few workers earn a good wage, some people still try to save money to buy livestock. During the period of field research, a married man who had worked in Nairobi for several years returned to the T clan settlement for a holiday, where he 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 with the expectation of exchanging them for females at a later time.

Compared to married men, relatively few warriors have stayed and worked in Nairobi. Interviews with T clan warriors revealed that most of them show some interest in working outside Rendille land. Nevertheless, most warriors have also reached a consensus that, as warriors, they have responsibilities to manage their livestock as leaders in the herding camps until the next warrior age-set grows up and can take over their work.

## Discussion

### Continuity and Potentiality in Pastoral Subsistence

In comparison with Sato's (1980) study in the 1970s, the change from nomadic to semi-nomadic has both influenced livestock management and increased interactions between people of the settlements and those in the towns. Consequently, the pastoral subsistence of the Rendille has changed from a relatively independent, self-sufficient system to a comprehensive one, which involves a pastoral production sector in livestock herding camps, a local political and social centre in settlements and a communication centre in local towns where people are exposed to regional and national politics and economy. The current livelihood of the Rendille relies on management by and interaction amongst these sectors.

The continuity and potentiality in current pastoral subsistence could be identified by two aspects; one is the persistence of livestock management strategies which enable people to sustain livestock-based livelihood in an uncertain environment, another is the challenge of new opportunities which assist people in responding to macro socio-economic changes.

The livestock management strategies practiced today consists of both technological and institutional adjustment. Pastoral technologies include raising multiple species of livestock and keeping high percentage of female animals in herd to secure considerable quantities of livestock products and reproduction; maintaining a certain number of livestock and keeping high mobility to absorb and avoid damages from unpredictable natural hazards; separating settlements and livestock herding camps and specializing herding tasks in camps to maintain high mobility; remaining seasonal fluctuation of human in herding camps to consume livestock products; etc. On the other hand, the social institutions function in such technologies include continuing the custom of communal use of land and water resources to ensure

high mobility; setting high value on livestock, especially camel to secure the self-sufficient livelihood; building cooperative relationships amongst households and settlements; and maintaining the age system and co-operative relationships, along with social distribution of labor in herding tasks. Obviously, it is the combination of these technologies and institutions that enable the Rendille to engage livestock management successfully. The interaction between settlements and herding camps has become more important under the current situation, as the activities involved in maintaining customs, co-operative relationships, and social institutions practiced mainly by elders of the settlements contribute to the organization and management of herding camps, whilst the pastoral production activities of herding camps secure and improve the livelihood of the settlement.

A significant practice among the challenge of new opportunities is well digging. The new wells dug in recent years connected the settlement to the herding camps; these wells both improved the living conditions at the settlement and enabled people to have more opportunities to gain livestock products. In addition, wells have improved the conditions affecting cattle-raising, which is regarded as the most practicable economic activity in response to the growth of a cash economy in Rendille land. Therefore, recent well-digging boom could be a positive sign showing an improvement to pastoral subsistence.

With sedentarisation, the Rendille have created a major "credit system" with small shops in town, which offers them the opportunity to buy food and goods from shops without cash in hand. The markets for livestock and livestock products in towns are also very important ways for people to earn cash. Moreover, the towns have been functioned as communication centers in recent years, where local committees hold meetings to discuss their problems, and learn more about the national economy and politics. In response to the growing demand for cash in their daily lives, people of the settlements have attempted new economic activities, such as wage work in both towns and big cities and small enterprises set up by groups of women. These could be considered as a process of diversification of the household economy, which may help reduce poverty.

**Suggestions for Future Pastoral Development**

Although the Rendille have achieved certain success in maintaining pastoral subsistence described above, the change in both natural and socio-economic environment in the past three to four decades has undoubtedly increased uncertainty to natural hazards and social stress. In search of future development in pastoral societies, we should not only work on making the best use of potentialities, but also identify the factors which may increase uncertainty, and consider how to reduce them.

First, Keeping high mobility of human and livestock is the most important livestock management strategy for nomadic pastoralism, which presented as a response to both environmental uncertainties such as the scarcity of natural resources and frequent droughts, and social and political uncertainties such as ethnic conflicts and livestock raiding. Major factors restricting the movement of pastoralists and their livestock in East African arid area have been indicated as the loss of resources, rangeland privatization and sedentarization, and insecurity (Galaty, 1994, Fratkin and Roth, 2005). In Rendille land, two factors are particularly important in maintaining the high mobility of livestock: the communal use of rangeland and relationships with neighboring ethnic groups. The Kenyan government has not pressed privatization policies in areas of Rendille Land because of the unpredictable climate as well as the dearth of productive land for cultivation. This state neglect gave the Rendille a great advantage in continuing their communal use of rangeland and moving their animals fre-

quently. However, ethnic conflict and livestock raiding between different pastoral societies remain unstable factors that affect human and livestock movements. During the period of drought, competition over the use of natural resources, such as water points and rangeland, may cause conflict between the Rendille and neighboring ethnic groups. If such conflicts or latent risks become escalate, they may reduce efficiency of resource use and provide further justification to policy-makers who favor privatization of rangeland and grazing controls as a solution to resource management. Therefore, it is important for both policy-makers and pastoralists to work together for a reasonable administrative guidance to support the function of local technologies and institutions in resource use and management.

Second, the sedentarisation of settlements near developing towns has occurred in most pastoral societies of East Africa in the 20th century. Some scholars consider the sedentarisation of nomadic pastoralists to be the "end of pastoralism", whilst development workers consider it a "departure for pastoralism". In Rendille land, although the seasonal fluctuation of human between settlements and camps remained, compared to herding camps, the contribution of settlements to herding tasks and access to livestock products has decreased. The married men, women and small children occupying the settlements became more dependent on relief food and other agricultural products bought from shops in town. For example, in 1999-2000 an extended drought was recorded, and relief foods were distributed by the WFP (World Food Programme) and missionaries in northern Kenya. Within two months of June-July, people of the T clan 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. When relief foods were sent to Korr, married men from settlements went to the town to attend a meeting at which schedules for receiving food were set 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, it is undeniable that relief distribution had pushed sedentarization ahead and increased the dependence of settlements on town.

Much work is needed to improve living conditions of settlements near the new towns, among these, working on ways to provide mobile schools, adult education and infant health care, as well as create more economic opportunities to the people living in the settlements should be encouraged. A notable feature of pastoral societies is that livestock management tasks are carried out mainly by unmarried young people at herding camps. The people living in the settlements are married men and women and their small children. Instead of persuading elders to bring their children back to school from herding camps, encouraging both mobile schools and adult education will give pastoralists more ability to challenge new opportunities. Other activities, such as promoting reciprocal groups and setting up small enterprises, may also help to reduce the vulnerability to poverty, and creating more opportunities for future development.

Third, the conditions in the arid and semi-arid areas of Africa have become more severe under the influence of the global environmental change in the 20th century. Recent studies show that the annual precipitation of the Sahel area of Africa have decreased significantly since 1960s, and drought occurred in this area are likely resulted from change in surface temperatures of the Atlantic Ocean (JISAO data 2008). During interviews with the Rendille, most people expressed strong concern with the increasing frequency of droughts, and other abnormal weather such as unexpected heavy rainfall brought by El Niño which also caused huge damage to

livestock. It has become more necessary and urgent to work on a comprehensive risk-management programme, which integrates both local knowledge and practice, and scientific technology such as drought early-warning systems, remote sensing and meteorological observations for sustainable development.

Most large-scale development projects supported by international development agencies and national governments in the 1980s and 1990s failed to achieve their goals. During this period, nomadic pastoralism was regarded as highly conservative, and pastoralists were criticized as both passive and uncooperative. However, the results of longitudinal and comparative studies show that the Rendille pastoral subsistence has changed from a relatively closed and self-sufficient system to a complicated local system in the last three to four decades. They are in the process of creating new livelihood strategies, which not only have the ability to maintain livestock herding, but also are capable of responding to profitable opportunities brought from outside. This case study further suggests that it is necessary and important to both understand the reality and the dynamics of pastoral subsistence, and re-evaluate and encourage the mobility, flexibility and creativity of pastoral societies for future sustainable development.

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