

Indigenous Knowledge of Desertification

A Progress Report from the Desert Margins Program in Kenya

January 1998

Steve Langill, IDRC

A.J.N. Ndathi, KARI

**People, Land and Water Series
Report 2**

For further information about this document, please contact:

Research Officer
People, Land and Water
IDRC, PO Box 8500, Ottawa, Ontario K1G 3H9
tel: (1-613) 236-6163
fax: (1-613) 567-7748
e-mail: plaw@idrc.ca

Acknowledgments

The Desert Margins Program (DMP) is an international research program developed by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and partially funded under IDRC's People, Land and Water (PLAW) Program Initiative. We would like to thank PLAW team members Don Peden and Luis Navarro, along with Saidou Koala of ICRISAT for their support, guidance, and helpful review and editorial comments.

In Kenya, the coordinating body for DMP research activities is the Kenyan Agricultural Research Institute (KARI), and we are grateful to Dr. Henry Cheruiyot and Dr. Woie for their guidance, help and support during our fieldwork in Kenya. Special thanks to Yusuf Aila for his collaboration and guidance in the field, and to all KARI extension staff in Marsabit, Ngurunit, Kargi and Korr.

Very special thanks to the following people from the settlements of Ngurunit, Kargi, Korr and Ilaut in northern Kenya for acting as our teachers and sharing their knowledge with us: Appolo Barnat, Lelikina, Osmond Lterino, Korewa Adakche, Jane Ommare, Julia Seyere, M.O. Haibor, Soburon, George Orre, Rage Turuga, Okoya Moite, Lebuk Mirgichan, Ngutai Wambile, Mbone Arnikli, Lepulote, Lemuko and all of the others from each settlement who participated.

TABLE OF CONTENTS

1. INTRODUCTION.....	1
2. OBJECTIVES AND METHODS.....	2
3. PROCEDURE IN THE FIELD.....	3
4. PROBLEMS ENCOUNTERED.....	7
5. SOME PRELIMINARY FINDINGS.....	8
5.1 Environmental Problems in the Region	
5.2 The Settlement of Kargi	
5.3 The Territory and Natural Resources	
5.4 History of Kargi	
5.5 Coping Strategies During Droughts	
5.6 Animal Health	
6. CONCLUDING REMARKS.....	22

List of Maps

- Map 1: Location of Study Area
- Map 2: Community Sketch Map of Kargi, Marsabit District
- Map 3: Rainy Season Grazing and Resource Map, Kargi, Marsabit District
- Map 4: Dry Season Camel Herd Movement, Kargi, Marsabit District
- Map 5: Dry Season Sheep and Goat Herd Movement, Kargi, Marsabit District

List of Tables

- Table 1: Historical Time-line for Kargi, Marsabit District, Kenya 1997
- Table 2: Historical Matrix of Coping Strategies in Times of Drought, Kargi, Marsabit District, Kenya 1997
- Table 3: Rank and Seasonal Incidence of Most Important Camel Diseases, Ngurunit, Marsabit District, Kenya 1997
- Table 4: Rank and Seasonal Incidence of Most Important Cattle Diseases, Ngurunit, Marsabit District, Kenya 1997

1. INTRODUCTION

The following report is based on fieldwork done in four indigenous settlements of Marsabit District, Eastern Province, Kenya. These settlements have been chosen as benchmark sites for activities related to the Desert Margins Program (DMP), an international research program developed by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). The main objective of the DMP is to develop sustainable resource management options to combat land degradation in nine countries of Sub-Saharan Africa. IDRC, under the People, Lands and Water (PLAW) Program Initiative, will be providing initial project funding to three countries (Kenya, Botswana and Burkina Faso) involved in the program. In Kenya, the coordinating body for research activities is the Kenyan Agricultural Research Institute (KARI). A major component of the research will be to inventory indigenous knowledge (IK) of land management practices and coping strategies related to arresting processes of desertification, loss of biodiversity and soil degradation.

Our research team made field trips to the settlements of Korr, Ilaut, Ngurunit and Kargi for several reasons: to introduce the DMP to local leaders and people and begin establishing rapport in the region; to test some participatory rural appraisal (PRA) data collection techniques; to collect some background data on indigenous knowledge of the environment and coping with desertification; and to test software systems for recording these data. This progress report summarizes our experiences in the field related to these objectives and briefly describes some of the information that local Rendille and Ariaal pastoralists shared with us.

The study area is located in northern Kenya, west of the town of Marsabit and southeast of Lake Turkana, in the Hedad and Kaisut Desert regions. The area is inhabited by Rendille and Ariaal pastoralists who rely on their herds of camel, cattle, sheep and goats for their primary means of subsistence. The climate of the area is arid to semi-arid, and the landscape is dominated by low volcanic hills, old lava flows and scrub desert, with very few permanent sources of water.

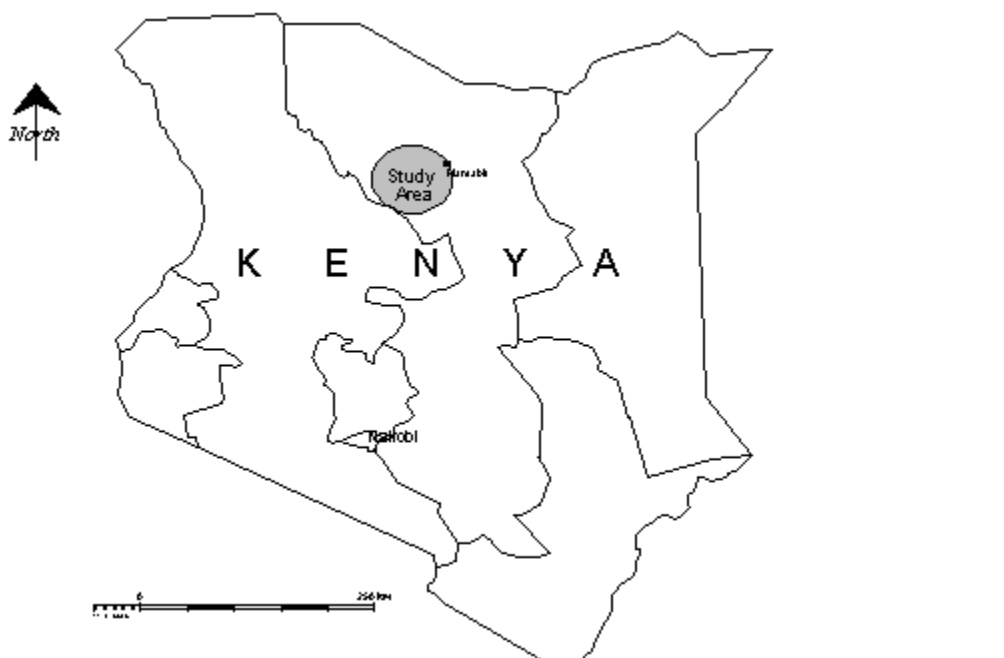
Map 1: Location of Study Area

2. OBJECTIVES AND METHODS

While the purpose of the trips was to realize some very general goals related to establishing rapport and a sound methodological approach to the DMP, we nevertheless intended to collect, at the same time, pertinent data that could be used as background material for our further research on indigenous knowledge of desertification. In this regard, our main objective was to elicit local knowledge of: environmental problems in the region; range management; and animal health. Specifically, we wanted to:

- (1) gain a general understanding of the environmental problems of the area as perceived by the local people themselves;
- (2) begin to collect general information about settlements, such as locations of main camps, water sources, services and other important features;
- (3) identify the territory as perceived by local people, the principle resources found there, and seasonal movement patterns of herds;
- (4) gain a general understanding of the major historical events that have occurred in the area, such as droughts and disease outbreaks;
- (5) identify some of the coping strategies that people have employed during times of drought.
- (6) identify some of the important camel and cattle diseases, and find out when they occur and what some of the local treatments are.
- (7) record IK data using ICONS¹ and MapMaker² software.

Although we collected some preliminary data from all of the benchmark settlements, we focussed most of our efforts in this initial period of fieldwork on the Rendille settlement of Kargi. As mentioned, we based our research on a PRA approach in which local people played a central role, and we used several techniques to elicit information. For a general understanding of environmental problems in the region, we used small-groups interviews of two to four people. To begin collecting



information on settlements, territories and natural resources, we went to Kargi and gathered together a fairly large group of local people for a series of participatory mapping exercises. Participants shared their knowledge of their settlement and lands by drawing maps based on their own perceptions. We digitized all maps using a GIS software package called Mapmaker. The village map gave us some basic information about the settlement of Kargi, and will facilitate future research based on, for example, random sampling, where a record of community households is essential. Our objective is to eventually collect similar information for all settlements involved in the DMP.

For a general understanding of important past events, we again initially focussed our investigation on Kargi, facilitating an exercise known as a historical time-line. This exercise involves gathering together a group of Elders and asking them to record in chronological order (on a line drawn in the sand) all historical events that they consider to have been important. The recording of such information not only gave us a general understanding of past social and ecological problems, it will allow us later in the research to more accurately discuss occurrences such as disease outbreaks, which are often not remembered as occurring in a specific year, but in relation to other, defining events.

In order to identify coping strategies during droughts, we facilitated a historical matrix exercise in Kargi, which involved two techniques in sequence: first, a small group of Elders participated in a brain-storming session in which they listed various coping strategies, along with years in which droughts have occurred. Second, we asked the Elders to then score each coping strategy according to its frequency of use during each drought. This exercise gave us an idea of what local people have done in the past during droughts, and what directions might be pursued in the search for alternative strategies.

Finally, to elicit knowledge of animal diseases, we used both small-group interviews and a ranking and matrix exercise. We asked groups of men from each settlement to name and discuss what they considered to be the most important diseases for camels and cattle in the area, and treatments for each disease. In the settlement of Ngurunit, we facilitated a matrix exercise in which we asked a group of Ariaal men to first rank livestock diseases according to their importance, and then indicate during which seasons of the year each was most likely to occur. We recorded some textual IK data with the ICONS data management software developed by the IUCN.

Along with the very specific information that each of these techniques would elicit, we hoped that they would act as “catalysts” and stimulate further, more in-depth discussion on each topic. We knew that the PRA activities that we had planned would simply be starting points from which more detailed information could be collected, and not ends in themselves.

3. PROCEDURE IN THE FIELD

Before leaving for the field, we had a chance to meet both the chief and an assistant chief of Kargi, as they were visiting in Marsabit where we were based. We introduced ourselves (one of the PRA team members knew the chief from previous fieldwork in the settlement) and explained briefly about the Desert Margins Program and the work that we wanted to accomplish during our upcoming trip. Both men were quite receptive to our plans, and gave their permission for us to carry out the

work, adding that they were pleased that we were interested in assisting the people of Kargi in finding solutions to environmental problems.

Our PRA team consisted of three core members: a range scientist and technical assistant from KARI who had worked in the region before, and a graduate student of anthropology from Canada sponsored by IDRC. We were joined in each settlement by KARI extension workers—local men who spoke the native tongue, Kiswahili and English and thus acted as interpreters. As these men had excellent rapport within their respective settlements, they also served as our primary contact with other community members, making arrangements for local people to meet with us and participate in our PRA exercises. Two members of our team, the range scientist and graduate student, had recently completed a PRA training course, while the other team members had had no prior experience with PRA techniques. It should also be pointed out that we had no women on the PRA team, an unavoidable circumstance due to a lack of availability.

Throughout our fieldwork, we stayed in the settlements themselves in guest-houses owned by KARI. We held PRA exercises once a day in mid-mornings, as local people had specified this time as most convenient for them and it was the most comfortable time to work outdoors, since the sun becomes too strong later in the day. Before each exercise, the PRA team would have an informal meeting to go over the details of the technique to be used and what we hoped to accomplish. We assigned each team member a specific role to play—interpreter, facilitator, and recorder, and although these roles did not change from exercise to exercise, there did occur some blurring of roles as the fieldwork progressed. The local extension workers, for instance, naturally became more and more involved in facilitating because of their language abilities, and all of us took notes to augment those being taken by the team member designated as recorder.

We were also very much interested in building a positive rapport with local people. Besides living in the settlements, which afforded us the chance to interact with villagers on an informal level, we also made our vehicle available for locals to collect fuel wood and building material, to make deliveries and to provide transport to individuals travelling to nearby settlements. We also attended, by invitation, a traditional dance called *Girtham* performed by the *moran* (young men) of the settlement. Taking photos was also a good rapport-building strategy, once local people gave consent and a promise made to send copies³. Such activities allowed us to meet and interact with people, and to begin building the trust that will be essential to the success of the DMP.

Small-Group Interviews

The 1 to 1 ½ hour interviews followed a semi-structured format, and were done in the local language through an English-speaking interpreter. We interviewed a total of 13 local Rendille and Ariaal people, including two Ariaal women who could speak English.

Village Mapping Exercise

Mapping exercises are usually the first carried out in a community when doing PRA, as they are simple, non-controversial, stimulating for participants and a good way to build rapport between researchers and local people. We began by choosing, with the advice of local men, an appropriate meeting place with a sufficient amount of shade and enough open space and material to construct

a map on the ground. When the group had gathered (about 30 men), an assistant chief whom we had met with earlier in the day addressed the group in the local Rendille language, explaining to those gathered who we were and what we wanted to do. After his short speech, we introduced ourselves to the group and explained, through an interpreter, about the DMP and its objectives, emphasizing that it would be the knowledge of local people that would form the basis of the research and that they would be playing the role of “teacher” and we of “students”. We then went on to explain the village mapping exercise to them, and why this was important and how it would be utilized for further research. Village mapping is a straight-forward exercise in which local people are asked to draw a map of the settlement area on the ground, including all landmarks which they consider to be important. We then began the exercise itself, by clearing a large area on the ground and first placing a stone to represent a central landmark in the settlement (the participants chose the church), and then allowing the men to fill in the map from there.

The exercise went very well, and in about an hour and a quarter we had a detailed map of the settlement, showing roads, seasonal rivers, water sources, buildings and all 32 *gob* or main camps with the clan, sub-clan and head-man designation for each. One of the Elders, who was an ex-school teacher, labelled each landmark in Rendille and English with a small piece of paper we provided. This system proved valuable later, when we transferred our rough copy of the map onto a larger sheet, as it provided us with a complete record of all place names which could be used to ensure the accuracy and completeness of the final version of the map.

When the men completed the exercise, we addressed the group once again to thank them for their participation and to compensate each of them, in the form of a small amount of cash, for their time. The Elders drew up a list of twelve participants whom they thought had contributed most (although we started with 30 men, many had drifted away by the time the exercise had ended to attend another function), and we gave these individuals a small cash payment. We also made plans to meet the following day at the same time and place to do the second PRA exercise on the project agenda.

Territory and Resource Mapping Exercise

Territory and resource mapping is carried out in an identical manner to village mapping, with the exception that local people are asked to draw a map of the territory surrounding the settlement and placing on it such things as nearby towns, roads, geographical features, and natural resources. This exercise is done to gain a quick overview of a study area and the natural resources that are locally available.

We began the exercise with a Rendille group prayer, and then we posted a copy of the village map done the day before, in order to give the men a chance to inspect it and check it for accuracy. After a few minor corrections and additions it was deemed acceptable, and we went on to explain the territory mapping exercise, asking the men to map all of the important land features and resources in their territory during the rainy season⁴. Once again, a central point of reference was chosen, in this case a rock representing Kargi, and the men continued from there, giving us a very detailed map of grazing areas, herd movements, water sources, firewood supplies, towns, mountains, seasonal rivers and locations of medicinal plants and fruit trees.

When the map was finished, we again recorded it with a photo to augment our rough sketches and gave the men compensation for their time. As this map took longer to complete (about two hours) than the village map, and as we did not want to keep the men any longer from their daily routine, we arranged to meet with a small group of men in the afternoon to do a dry season resource map. Three Elders participated in this exercise and, as it was too hot to work outside, we worked inside the guest-house on a large table, again using stones and written labels to construct the map.

Historical Time-Line Exercise

Once again, we began the exercise in mid-morning with a group prayer followed by a presentation of the maps drawn the day before. For the time-line exercise itself, we asked the six Elders gathered⁵ to represent, on pieces of paper, important events in Kargi's history for as far back as they could remember, and to place these in chronological order on a line drawn in the sand. Initially, we had explained that they should begin with the most recent events and move backwards in time from there, but the group decided that it would be easier to begin at a seminal event in the past (the 'bombing' of Marsabit town in 1941) and move forward.

While there was some problem with putting years to some of the events, particularly before about 1960 or so, they nevertheless constructed a very detailed list of events—droughts, disease outbreaks, circumcision ceremonies, and raids and counter-raids—that took over two hours to complete. This exercise was not as stimulating for the men as the mapping exercises, going quite slowly at times, and the heat, even though we were partially shaded by an acacia tree, made things quite uncomfortable. Afterwards, we gave the men compensation, and gave a small gift to the assistant chief and the Elder who had been making the labels for the various exercises, to show our appreciation for their cooperation and extra help. We also took several photos of the men, with the promise that we would send them copies as soon as possible.

Later in the afternoon, we arranged an interview with an Elder in order to corroborate some of the historical information we had recorded and to fill in some of the dates that we missed earlier in the day. This man, who had not been present at the morning's exercise and who was recommended to us by the other men as being particularly knowledgeable about past events, proved to have a wealth of information about the history of the area. Not only was he able to fill in some of the gaps in our information, he kept prodding us to ask him more questions, seeming to enjoy his role as teacher. Afterwards, we took his picture and gave him the usual compensation for his time.

Historical Matrix of Coping Strategies Exercise

We facilitated a historical matrix exercise with a group of three Elders the following morning in the guest-house. We first asked the men to brainstorm about strategies that could be used to survive in times of drought, and to record each on a small piece of paper. Similarly, we asked them to name and record all of the periods of severe drought that they could remember. We then arranged these labels in a matrix configuration on the table, with coping strategies in a vertical column and drought years arranged horizontally across the top. We then gave the men a number of small stones, and told them to score each coping strategy according to its frequency of use for each drought.

Originally, we had specified that they use only up to three stones for the scoring, but the men insisted on using up to four, with four representing the highest frequency of use for a strategy. Once again, the men responded very well to this exercise, and it stimulated much animated conversation among them, with all participants contributing. When the session was over, compensation was once again given and photos taken.

Ranking and Matrix Exercise

We facilitated a PRA exercise in the town of Ngurunit, in which we asked a group of four Ariaal pastoralists to first rank livestock diseases according to their importance, and then indicate during which seasons of the year each was most likely to occur. We initially asked the group to name the most important (e.g. dangerous) diseases for camels, and then rank them in order of importance, with the exercise being repeated for cattle diseases. We then asked the men to name the local seasons, which they did in both Samburu and English. The matrix exercise was then explained, and the men chose objects to represent each season, as well as the first camel disease on the ranked list, and arranged them in a matrix configuration on the ground. We then gave the men a number of small stones, and told them to place three stones under a season if the disease had a high occurrence in that season, two stones if occurrence was moderate, one stone if occurrence was rare, and to leave the space blank if there was no occurrence at all. This exercise was repeated for each disease in turn. Overall, the men responded extremely well to the exercise, and it stimulated much animated discussion among all of the participants, both related to the exercise itself, and about animal health in general. The men were so enthusiastic that, after a short break, they insisted on repeating the exercise for cattle diseases.

4. PROBLEMS ENCOUNTERED

Not unexpectedly, we experienced several methodological problems during our fieldwork which will have to be addressed as the DMP progresses. First, the make-up of the PRA team itself presented a few problems. Because we had no women on the team, we couldn't include local women in many of our PRA exercises. In Kargi, as in other Rendille communities, it is simply not acceptable for a male outsider to speak to groups of women—the men become extremely suspicious of such activities. Women are also not comfortable speaking with a male facilitator and, even in mixed groups, women tend to stay quiet and defer to the men. It will be necessary, as the research continues, to include female facilitators on the PRA team, so that women can participate fully in PRA exercises in an unrestrictive manner.

Another problem arising from the make-up of the PRA team was our inability to conduct exercises directly in the local Rendille language. We had to give instructions during exercises in English or Kiswahili, which few locals understand, have them interpreted into Rendille, and then have any responses interpreted back into English or Kiswahili. Not only is this tedious and time-consuming, but it ultimately compromises the accuracy of the information given as it passes from one language to another. While the use of Kiswahili was less problematical because it is understood by a greater number of locals, translation was still required for the significant number

of Rendille, particularly Elders, who do not speak it. To avoid these problems, local people should be trained to carry out the PRA exercises themselves. Not only would this contribute to capacity-building, it would be the most effective way of collecting data.

Second, we will have to ensure that a more representative sample of people be chosen for each exercise. The same group of men participated in all four PRA activities, and while this poses no particular problem at this early stage of the research, we will nevertheless have to be aware that a broader spectrum of people will have to eventually contribute their knowledge to the project. The group we worked with was primarily made up of male Elders, so that women, girls, boys and young men were not represented. The fact that we offered monetary compensation to individuals who participated may cause difficulties later when we try to address this problem, as the male Elders we worked with may try to monopolize any cash that is being made available, to the exclusion of other groups who should participate. Availability of people, particularly of young men who live outside of the main camps for most of the year or of women whose daily schedules may be too busy, will also have to be taken into consideration when designing a more balanced approach to local participation. For example, during one of our mapping exercises, many of our participants had to leave early because of a political rally that was being held by a local politician (who, by the way, was offering free beer to anyone who would attend).

Third, we will have to develop a more systematic approach to compensating local people for their participation. Besides the potential conflict caused by power struggles as described above, we had problems deciding what amount to give each person and who to pay when a large group was involved in an exercise. This latter we tried to control by inviting only a certain number of men to each exercise, but some would leave and others would drift over and it is not recommended, for the sake of rapport-building, to turn people away during an exercise. Ultimately, we left it up to the participants, asking them to draw up a list of those they thought participated on a consistent basis. Again, though, this type of arrangement may be affected by power struggles within the community. One suggestion would be to set up some sort of centralized trust fund, which could then be administered by local leaders and people to benefit the entire community as they see fit.

Finally, we will have to address the problem of protection of local rights (e.g. intellectual property rights, benefit-sharing, recognition through authorship, rights of censorship) over any knowledge that is collected and recorded. The payments we gave were strictly to compensate participants for their time, as a sort of hourly wage, and were not associated in any way with the “purchase” of the knowledge or the rights to it. As well, appropriate ways of disseminating the findings of our research back to the community will also have to be discussed. While we were careful to present any completed maps and charts to community members after each exercise for their inspection and approval, and copies of this report will be sent back to the chief and other participants in Kargi, we will have to have agreements for more formal ways of returning the knowledge back to the entire community.

5. SOME PRELIMINARY FINDINGS

The PRA exercises described above, along with the discussions they generated, allowed us to uncover a wealth of local knowledge in a short period of time. However, these data should only be seen as a beginning to the research, and are perhaps most valuable for providing background

information from which further questions can be generated and a more focussed investigation planned. The information recorded here reflects the knowledge and views of the local Rendille and Ariaal themselves, without comparison or corroboration from more scientific sources of data.

5.1 Environmental Problems in the Region

Lack of Water

Local people in all four communities mentioned lack of water as a major concern. They blame the lack of water on several factors, including drought, poor design and location of wells, and over-use of water-holes caused by population growth and increasing sedentarization. Lack of water, they say, can weaken livestock, causing productivity (e.g. milk yields, weight) to decline and making them more susceptible to diseases, which also spread more readily when the herds are forced to concentrate around a few permanent water sources. A lack of rain also causes pasture quality to decline, and important plant species to disappear.

In Korr, the Rendille mentioned that a lack of rain and the resulting drought conditions in the area are a major problem that has gotten worse over the years, with people having to move their livestock further and further afield to find adequate water and pasture resources. In Ilaut, the water level in the wells dug on the dry river bed has gotten so low that it takes a chain of seven men from bottom to top to pass water up for use. They suggest that more wells should be dug to supply water for a growing population, but that they must be designed better, for two reasons. First, they say that the wells should have some sort of cover placed over them, because when it rains, silty water is carried over the lip of the well and contaminates the well-water. Second, the wells should be better located or protected somehow because they are sometimes swept away during the rainy season, since they are located in the river bed. In Ngurunit, the wells dry up after five or six months without rain, and they are only reliable when the rainy season has been good. The water table here is also low, requiring a number of men to fetch water, and when there is drought, the well water becomes dirtier, so that some people boil the water to make it safe for drinking. In Kargi, the only permanent water-hole is the Korole Springs, a factor which contributes to the spread of livestock diseases, since all livestock are taken here to be watered. Rain water is also not properly utilized as a possible direct source of water, since the Rendille here do not build dams to capture and store it.

Sedentarization

The tendency towards sedentarization was also mentioned in all communities as a major contributor to environmental and social problems. In the past, local people followed a more traditional pastoral lifestyle, moving herds each season according to pasture and water availability. This cyclical movement meant that areas grazed in one season were left to regenerate in the next, so that overall impact on the environment was minimal. However, now people are not moving as they did in the past, preferring to stay in or near town, and this has resulted in over-grazing and degradation of rangeland, malnutrition and disease in livestock, and deforestation as people continue to cut down trees for *bomas* (livestock enclosures) and fuel. Reasons given for this include the preference to be near amenities such as schools, medical facilities, markets, stores and permanent

water sources such as wells and bore-holes; the greater security afforded by large numbers in the face of livestock raiders, who make venturing far from the towns extremely dangerous; and a decreasing ability to move dwellings, supplies and possessions great distances due to a shortage of loading camels lost through drought and disease.

In Korr, the local men related how the Rendille *gob* (main camps, where old, young and milk animals are kept) and *forr* (small satellite camps where stronger animals are kept) would move frequently to outlying areas for water and pasture in the past. However, now they are moving much less because of a fear of raiders and a lack of loading camels, which have died from drought and disease. This lack of movement has led to a high degree of deforestation in the area around Korr as trees have been cut down for *boma* construction and fuelwood, with the general practice being to fell the entire tree rather than cutting only branches. The men say that they must travel greater and greater distances to find wood for these purposes.

In Ilaut, grazing areas close to town are being depleted because movement of herds to fresh pastures is constrained once again by the fear of possible livestock raiding. Under normal circumstances, the men of Ilaut take their livestock west and north towards South Horr and Korr during the rainy season to find water and graze, and come back towards town in the dry season to utilize the permanent water-holes and wells. However, this seasonal movement has recently been disrupted by raiding, and now people are afraid to go into the Hedad south of Kargi. The men say that herd movement has become greatly restricted, and that they are “boxed-in” on all sides: they can’t move north and west because of raiders, they can’t move east because of raiders, and they can’t move to other areas because they have unsuitable resources available. However, deforestation in this area is not nearly as severe as in Korr or Kargi as the community has made a conscious effort to preserve trees. For example, every main camp has one person assigned to make sure that trees are not cut down—only a few branches are permitted to be cut from each tree, so that the tree will continue to survive. If an entire tree is cut down, there is a very stiff fine of ten cows, or eight goats if done by a child. This system, they explained, has been very effective in halting the destruction of trees. The Rendille of Korr used to come to the area to fell trees, a situation which caused much conflict with the local Ariaal, but this practice has been stopped through the vigilance and determination of the locals.

In Ngurunit, the men told us how, in the past, they used to move great distances to graze their livestock, often as far as Gabraland in the Chalbi Desert to the northwest of Kargi. They explained how, during times of drought, different areas receive different amounts of rain, so they herd their livestock to places where it has rained or is raining, since there will be an abundance of water and quality grazing vegetation available in that area. For example, during the short rainy season Marsabit is usually the best place to go because it receives the most rain, while Baragoi to the west is the preferred area during the long rains. Laisamis to the east is also a good rainy season destination. But because of raiding, these destinations have become extremely risky to travel to, and people are concentrating their herds in the “safe” areas near town, with the result that these areas are being completely cleared of vegetation during the dry season and are not given a chance to recover. As in Ilaut, deforestation was becoming a problem in the area until a fine of one goat (three if the person is wealthy) was put in place for anyone who cut down an entire tree. The Ariaal men that we spoke to told us that it was the Rendille who followed the practice of cutting down the entire tree when they need wood, while the Ariaal only take a branch or two so that the tree continues to live

and produce. This approach to tree conservation has been very successful, with nobody felling trees in the area anymore.

In Kargi, increasing sedentarization has led to a high degree of deforestation, over-grazing and degradation of pasture around water points as well. In the past, the Rendille here didn't even need permanent water resources, as they relied on seasonal movement of herds to obtain water and pasture. However, fear of raids has led people to cluster together for defensive purposes around the permanent water points.

Livestock Raiding

As is apparent from the discussion above, livestock raiding is of great concern to local pastoralists. It not only restricts seasonal movement of herds, causing over-grazing and degradation of local resources, it results in the more immediate loss of livestock through theft and, occasionally, the loss of human life. Traditionally, livestock raiding was carried out as a means of restocking herds after losses through disease or drought, and was done between groups who were relatively evenly matched, both in manpower and in weaponry. There was a certain amount of caution and respect involved, since a raid too brash could mean the loss of one's life, and there was always the threat of retaliation. However, as we were told by the Rendille and Ariaal men we spoke to, now raiders are attacking in huge numbers armed with automatic rifles, against people trying to defend themselves with spears and clubs. The traditional "balance" and caution has been lost, and raiders no longer have any fear due to their new-found omnipotence, knowing they risk little engaging in such activities. While local people have started using guns in an attempt to protect themselves, they have only been doing so for the last year or so, and their lack of experience with guns, coupled with the difficulty in obtaining both guns and ammunition, means that they are still a long ways from being able to properly defend themselves and their livestock from armed raiders.

In Korr, they say that raiders are armed with automatic rifles and attack in the more isolated grazing areas. When a lack of pasture drives stock owners to move their herds further afield, there is more chance of trespassing on the lands traditionally used by other peoples, and conflicts become more frequent. The fear of these raiders has caused people to cluster together nearer to the town for defensive purposes.

In Ilaut, the men would like to be able to attack the raiders in retribution, but say they lack the manpower and the guns to make this possible. What they are trying to do is set up a defensive system, although to date they only have four rifles among them. In Ngurunit, we were told that there has been an overall increase in raiding over the last ten years. Again, the men explained that, because of drought and the resulting need to move the *forr* further and further away in search of good land, there is an increasing tendency to meet with hostile groups competing for the same resources. In Kargi, they say that the only solution to the problem of raiding is through traditional peace arrangements, whereby Elders from each group meet to discuss and solve the problem.

Animal Health

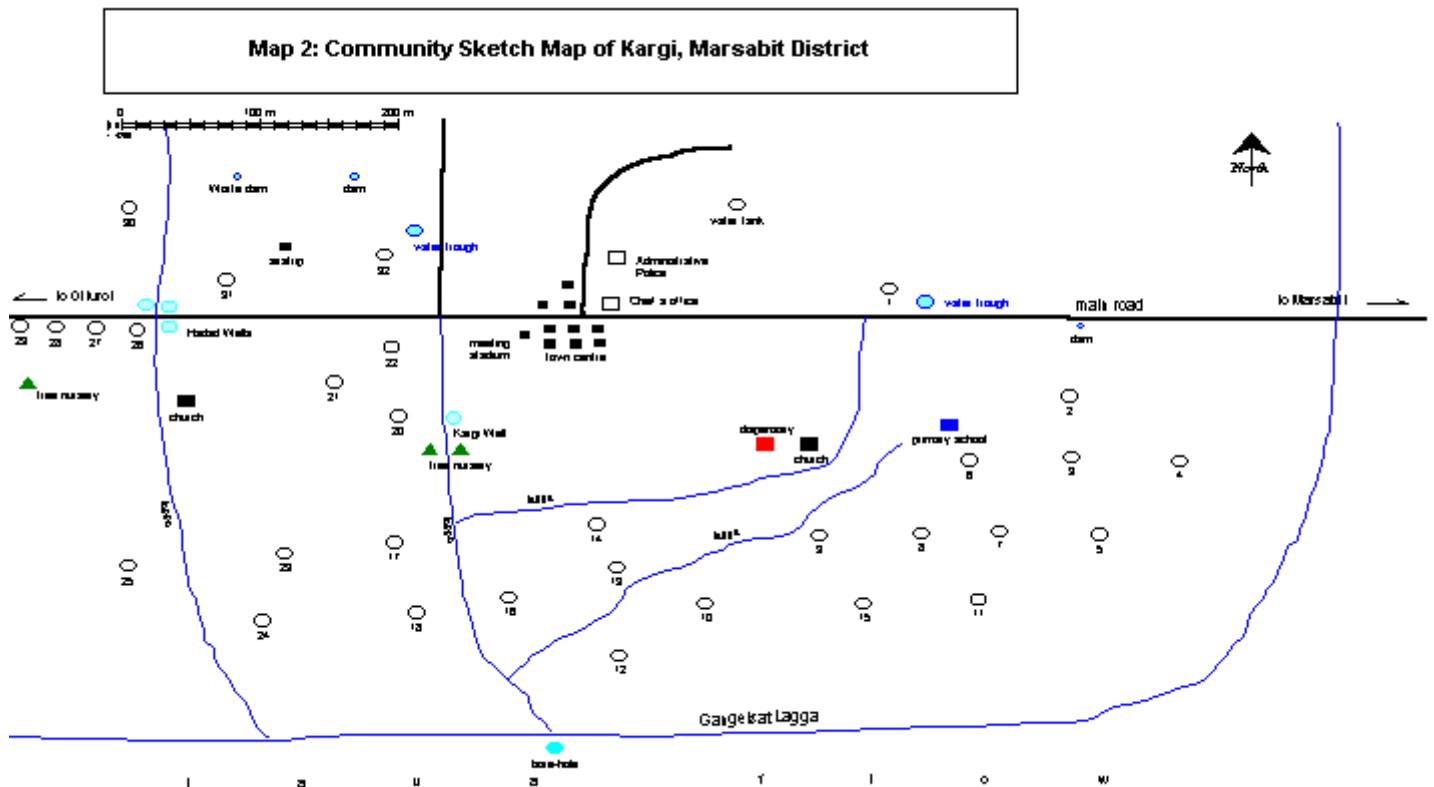
Not surprisingly in an area where local people rely almost exclusively on a pastoral way of life, animal health is of primary concern. Dangerous livestock diseases, we were told, are on the

increase, and this is attributed to several factors. First, malnutrition caused by a lack of water and quality pasture can weaken animals, making them more susceptible to disease. Second, concentration of herds around a few watering points due to the factors described above facilitates the spread of infectious diseases, a situation avoided in the past when main and satellite camps could disperse to take advantage of favorable conditions in outlying areas. Finally, local pastoralists say that they have very poor access to modern veterinary drugs and care, and even when the drugs are available and locals can afford to buy them, there is little knowledge given on how to properly administer them.

5.2 The Settlement of Kargi

Kargi is a Rendille settlement situated in a scrub desert region of northern Kenya, just northwest of the town of Marsabit. While it has a small airstrip, its main link is via a dirt track, with minor tracks linking it to other settlements such as Olturot in the northwest and Korr to the south. The settlement, which is criss-crossed by several seasonal rivers or *laggas*, has a dispensary staffed by a part-time nurse, two churches, a primary school, a town centre with various small shops and businesses, and several sources of water including wells, water pans or *silango* and water troughs fed by a bore-hole. The town does not have telephone service or electricity.

The villagers, for the most part, continue to live in traditional camps known as *gob*, which



is also the Rendille word for “clan”. Social organization is based on a system which is comprised of two moities (*Belisi Bahai* and *Belisi Beri*) divided further into clans, sub-clans, and finally patrilineages. This is reflected in both the composition and location of each of the 32 *gob* in Kargi. The *gob* is made up of a number of households whose members are related to one another at the patrilineage or sub-clan level⁶, and *gob* with similar sub-clan or clan affiliations tend to cluster fairly close to one another within the settlement (see Map 2, following page). Each *gob* is designated by its clan, sub-clan and the patrilineage of its headman or *eti gob iwen*, and is characterized by a roughly circular collection of huts enclosed by a thorn fence. This fence is pierced at intervals by gates, each belonging to a separate household, and the interior of the camp is divided into numerous *bomas* or livestock enclosures where camel, sheep and goats are kept at night. All fences for enclosures are made from the branches of various species of acacia tree, and the amount of material required for this, coupled with the increasing need for fuelwood from a growing population, has meant that a great deal of pressure has been placed on already scarce tree resources in the immediate vicinity of the settlement. While there have been attempts to ease this problem in recent years with the establishment of tree nurseries for reforestation and the banning of tree cutting in and around the settlement, tree and bush cover remain quite sparse in Kargi.

Main Camps of Kargi

map no.	Clan Name	Sub-Clan	Head-man's Family	map no.	Clan Name	Sub-Clan	Head-man's Family
					<u><i>gob</i></u>	<u><i>khod</i></u>	<u><i>eti gob iwen</i></u>
				21	Sale	Gabore	Choya
				22	Nahagan	Galgorowle	Galgorowle
				23	Dubsahai	Gudere	Nolaso
				24	Uyam	Alyaro	Alyaro
				25	Dubsahai	Bulyare	Bulyare
				26	Rengumo	Arbelle	Banne
				27	Nahagan	Durolo	Durolo
				28	Rengumo	Galigacho	Esimafgalboho
				29	Rengumo	Arbelle	Hambule
				30	Rengumo	Arbelle	Sahado
				31	Sale	Galoro	Guthuru
					Matarbah	Fecha	Meite
				32	Dubsahai	Kulali Orat,	Galahai
						Gudere,	
						Mirgichani	
7	Galdeilan	Keleyo	Kele				
	1	Sale	Gabanayo				
	2	Sale	Gabanayo				
	3	Sale	Urowen				
	4	Sale	Urowen				
	5	Sale	Urowen				
	6	Sale	Gabanayo				
	8	Galdeilan	Elemoyo				
	9	Galdeilan	Amamelsa				
	10	Tupcha	Galdeidayan				
	11	Galdeilan	Amamelsa				
	12	Sale	Nebei				
13	Odola	Odola	Mahabale				
	14	Sale	Gabanayo				
15	Galdeilan	Mathacheyo	Matacho				
	16	Sale	Gobanai				
	17	Sale	Elegela				
18	Rengumo	Arbelle	Addi				
	19	Rengumo	Ongom				
	20	Rengumo	Arbele				

5.3 The Territory and Natural Resources

Roughly speaking, the Rendille territory is bounded by Lake Turkana in the west, Mount Marsabit in the east, the Chalbi Desert in the north and the Ndoto Mountains in the south. Within this large territory, the Rendille feed and water their herds of camel, sheep and goats, and collect fuelwood, building material, medicinal plants, and wild fruits and vegetables.

The Rendille of Kargi follow a traditional pastoral lifestyle which involves the seasonal movement of herds between pasture and water sources. Such cyclical movement remains a key strategy for the sustainable use of resources, since it means that water and pasture resources utilized in one season are left to regenerate in the next. However, in recent years the trend has been for the Rendille to become more and more sedentary, the majority preferring to stay in or near town, and this has resulted in over-grazing and degradation of rangeland, malnutrition and disease in livestock, and deforestation, particularly in the immediate vicinity of the settlement. Fear of raids in particular has led people to cluster together for defensive purposes around the permanent water points.

Main *gob* camps, where old, young and some lactating animals are kept generally remain stationary within the settlement itself, while smaller satellite camps or *forr*, comprised of the stronger animals, are the units constantly on the move. Both young men and women are normally based at these satellite camps, with the women and uncircumcised boys doing most of the herding and the young men of the *moran* warrior age-set there mainly to provide security. The mobile *forr* camps are moved to wherever there is pasture and water available, usually staying in a particular area for between two to four weeks before moving on. Each *forr* keeps either herds of camel or smallstock (sheep and goats); the two types of livestock are never grazed together due to their differing water and pasture needs. This means that, at any one time, each household will have a number of *forr* camps active, besides having their herds based in the main *gob* camp.

In the two rainy seasons of *Yer* (October to December) and *Guu* (March to June), the general pattern is for the *forr* herds to converge around the settlement, a strategy made possible by the abundance of water and pasture resources. This provides the main camps with a source of milk and allows the members of the satellite camps to stay with their families and to participate in the various celebrations that occur at this time. However, in drought years the lack of water and pasture force the Rendille to disperse their herds and move them to more distant areas (see Map 3, following page). Herders will literally “follow the rain”, moving their animals to places where they know the rain has fallen or is falling. Because of this pattern, the risk of being raided increases, as *forr* move further out and become more isolated.

During the two dry seasons of *Nabhaidar* (June to October) and *Nahaigaban* (January to March) herd movement is centred around the more reliable wells, when water and pasture resources become scarce (see Maps 4 and 5, following pages). For example, the Korole Springs to the north of Kargi are a prime source of water at these times of the year, with herders driving their animals back and forth between this permanent source of water and the few areas with adequate graze. In times of extreme dryness, the Rendille take their animals to towns such as Ilaut, Ngurunit, Laisamis, Arsim, Merille and Koya to the south and east of Kargi, where both water and pasture are usually more readily available and in close proximity to one another. According to the men we spoke to, this does not cause any conflict with the Ariaal and Samburu pastoralists living in these areas, and permission need not be asked to utilize these resources. If the situation is extreme, as a last resort the Rendille will ask the Gabra to the north to allow them access to their territory, with the area around Maikona being preferred. The Gabra, too, will approach the Rendille in difficult times, and have been given permission in the past to bring their animals to the wells and pastures near the settlement of Baleisa.

Generally speaking, though, the Rendille have a somewhat antagonistic relationship with the Gabra, and do not normally take their herds north because they fear raids. Several Elders related

how they used to regularly venture into Gabraland to graze and water their animals, but that it had become too risky in recent years. One old man told us that, if you travelled to this area, you would still be able to find the stones left from old cooking fires made many years ago by his father. Pastures in the western part of Rendille territory around Loyangalani have also been abandoned because of raids from other groups, so that, overall, the traditional territory has shrunk over the past several decades.

Moving a *forr* camp to another location is a joint decision made by the *moran* and their immediate elder relatives, after the young men relate their observations of conditions and give their opinions. However, there is a traditional specialist known as the “Dreamer” or *Moro*, whose function is to predict future occurrences such as droughts and raids, and who holds great influence over decision-making. The *Moro* can come from any of three sub-clans: *Adisomele* (clan *Ogom*), *Galoro* (clan *Sale*), or *Galgoroule* (clan *Nahagan*). Predictions are made either by observing the moon, stars and clouds, or through dreaming, depending on the sub-clan of the *Moro*, as each has its specialty. When the *Moro* wishes to induce dreams, a goat is slaughtered and both he and his sons consume a broth made from boiling the head and mixing in goat’s milk, and then going to sleep soon after. In the morning, the *Moro* gathers his sons together and each relates his dreams of the night before, which he then interprets to predict future phenomena such as weather patterns, water availability, pasture conditions and livestock raids. If the *Moro* sees an immediate danger, such as an impending raid, he has the power to order even far away *forr* camps to return to the settlement at once.

Other natural resources utilized by the Rendille are not so affected by seasonality, being harvested from the same areas throughout the year. For example, firewood is collected in four main areas, including the Bugere and Burahle Hills south of Kargi, and the Halibareh and Kabotalo Hills to the north (see map 3, rainy season resources). The medicinal plant called *otha* used to cure certain camel diseases is harvested near the Kahi Wells north of the settlement of Olturot, while *dolo*, another plant with curative properties, is broadly distributed throughout the territory. Wild fruit is usually collected during the rainy season and stored for use during droughts. *Medeer*, a small berry that is widely spread throughout the rocky hills of the Rendille grazing area, is found, for example, near Hali Gudan Hill along the road to Marsabit as well as near Korongegab Hill to the south, and other wild fruits (not shown on map) such as *khona*, *baar* (dum palm) and *akhai* are also found in the territory, although we have not yet recorded their locations.

5.4 History of Kargi

Kargi was first 'settled' in 1949 by a Rendille man named Rage Hafare Turuga, who asked permission from the district commissioner of the time to settle his family there and build “a roofed house” in which they could live. As table 1 below indicates, though, the Rendille had been living in the area for some time prior to this event. It is particularly revealing to see the kinds of events that the male Elders deem important in Kargi’s history: circumcision ceremonies, raids and counter-raids, animal disease outbreaks, and droughts—all phenomena which, although greatly affecting women as well, are particularly important in the lives of men.

For example, the male circumcision ceremony is a major means through which the passage of time is marked in Rendille culture. This ceremony, called *Khandi*, is done every 14 years or so

to initiate a group of uncircumcised boys into the next level of maturity where they become *moran* warriors. These individuals make up an “age-set” which will move through the various levels of maturity or “age-grades” of Rendille society together, forming a cohesive, close-knit group which its members can rely upon for help and support for the rest of their lives. The young men remain as *moran* for about 14 years, after which they move to the next age-grade and are allowed to marry.

Raids are also well-remembered, particularly those involving loss of human life. It is interesting to note that there appear to be no instances of the Rendille carrying out unprovoked attacks on their neighbors—all Rendille raids seem to be counter-raids for revenge. Whether this is due to an inherent peaceful tendency on the part of the Rendille or a case of casting one’s own actions in as favorable a light as possible, is difficult to say at this point in the research.

Disease outbreaks in livestock are also remembered as important events, for obvious reasons. Events which affected wild animals, such as the disease outbreak among antelope in 1971 and the rains just prior to 1957 which trapped giraffe in mud, illustrate an interesting facet of Rendille culture: they never hunt wild game unless it somehow becomes readily and easily available. Beyond the obvious reason of obtaining quantities of meat with little effort, this may be an indication that there exists among the Rendille an ethic in which the suffering of animals is abhorred and should be alleviated if possible. Although there was some hints that such an ethic exists, this area requires further, more focussed research.

Table 1: Historical Time-line for Kargi, Marsabit District, Kenya, 1997

1996	Large raid on Rendille while at Baragoi, a Samburu grazing area. Many animals are taken.
1993	Circumcision of <i>Ilmowoli</i> age-set.
1992	Raid on Rendille. Camels taken from <i>Galtheiran</i> clan.
1991	Severe drought: many animals die, people receive relief food from government.
1990	Marriage of <i>Ilkiroro</i> (<i>Debgutho</i>) age-set.
1987	Disease outbreak: <i>ilkibei</i> or pleuropneumonia appears for the first time in area.
1984	Severe drought: many animals die, yellow maize is given out for famine relief.
1979	Circumcision of <i>Ilkiroro</i> (<i>Debgutho</i>) age-set.
1976	Marriage of <i>Ilkichili</i> (<i>Terya</i>) age-set.
1975	Circumcision of <i>Sabade</i> girls for marriage to <i>Ilkichili</i> (<i>Terya</i>) age-set.
1974	Large raid on Rendille at Baragoi—many camels are taken.
1973	Eclipse of the sun, <i>sapthii hii orahalakhapte</i> . Rendille believe that the government “has gotten hold of the sun”.
1971	Disease outbreak in wild animals: antelope, dik-dik “go blind” and are easily taken by Rendille for meat.
1970	Severe drought: government brings relief food (fish and rice). Unable to sell animals as there is nobody to buy them.
1969	Prominent Rendille Elder Bargeris is killed by raiders. Rendille retaliate and kill 56.
1968	Disease outbreak: many camel calves die of unknown disease.
1967	Leader of raiding party is killed by Rendille as he is camped out waiting to raid Kargi. The raid is aborted.
1966	Rendille Elder Turuga is killed at Karare. Rendille retaliate and kill 55. Rendille retaliate but are unsuccessful, losing many men. Raid on Rendille at Kargi. Over 50 killed.
1965	Circumcision of <i>Ilkichili</i> (<i>Terya</i>) age-set.
1964	Raid on Rendille at Bagasi wells. A number are killed.
1963	Rendille girl is killed by raiders while herding.
1961	Raid on Rendille, camels taken from <i>Gabore</i> sub-clan.
1960	Violent conflict between Rendille and raiders. Men are killed on both sides.
1957	Disease outbreak: worm infestation in sheep and goats which causes the throat to swell. Kills many animals. When meat is butchered it is a greenish-yellow colour.

- ? Disease outbreak: *afturo* or camel pox.
- ? Rendille kill thieves attempting to steal goats near Mount Nyiro.
- ? Second Rendille man, Ah Gelle, settles family in Kargi.
- ? Heavy rains trap giraffe in mud, and they are taken by Rendille for meat.
- ? Rendille kill raiders near Kurkum.
- 1953 *Galgulime* ritual, held one year after circumcision, for *Ilkimaniki (Irbandif)* age-set.
- 1952 Circumcision of *Ilkimaniki* age-set.
- 1949 Severe drought: many animals die, particularly sheep and goats.
Turuga is first Rendille to settle in Kargi.
- 1948 Marriage of *Ilmauri* age-set.
- 1947 Camels from *Gabanayo* sub-clan are ``arrested`` by colonial police for crossing grazing boundary.
- 1946 *Galgulime* ritual for *Ilmauri* age-set, postponed because of drought.
- 1945 Rendille chief Chudukle is arrested for not following orders of colonial authorities.
- 1943 Raid on Rendille, *Ogom* family is most affected.
- 1942 Neighboring tribes involved in violent conflict, colonial government recruits and trains Rendille to assist one side.
- 1941 Marsabit is bombed.
- 1937 Circumcision of *Ilmauri* age-set.
- 1910 Severe drought: Rendille travel to Barseloi in search of food, seek help from Samburu and receive loan of cattle.
- 1890 Severe drought: Rendille exchange children for dried meat from Gabra.

5.5 Coping Strategies During Droughts

Droughts, unfortunately, have occurred at regular intervals throughout the recent past, causing loss of water and pasture resources and, ultimately, the death of livestock and humans. The Rendille believe, based upon their traditional calendar which is constituted of a repeating seven-year cycle where each year is named after a day of the week, that droughts can occur only every seven years in the year called Arbaati (Rendille for “Wednesday”), which is considered to be the year for natural disasters. Thus, droughts have occurred in 1991, 1984 and 1970, skipping the Arbaati year of 1977; and in 1949⁷, skipping the Arbaati years of 1963 and 1956, although the latter is associated with heavy rains and disease outbreaks in livestock. Before 1949, the Elders were unsure of exact years in which droughts occurred. Based on this, the Rendille are expecting a drought during the present year of 1998.

As Table 2 below indicates, the Rendille have a number of coping strategies which can be utilized during times of drought, although not all strategies are employed equally for each drought. For example, during the drought of 1890 when people were “dying in the shade” as one Elder put it, the Rendille went up as far as Moyale in Gabraland to exchange some of their children for dried camel meat, a practise that has not been repeated since⁸. Slaughtering camels to eat, on the other hand, is a very common strategy that has been used during every drought in the past, although the practise declined somewhat in 1970 and 1991, when the government and NGOs provided people with famine relief. This practise is usually done collectively, with two or three camels being chosen out of all of the herds in a particular *gob*, with the meat distributed equally to all of its members. Sheep and goats are always slaughtered for consumption during droughts as well, although this is done individually by each family from their own flocks. Cattle are not often slaughtered simply because the Rendille do not keep many, although, as in 1890 and 1910, they could trade a camel calf to their Samburu or Boran neighbors for a few cows to slaughter. Borrowing camels for milk and to restock depleted herds is also an important drought survival strategy, with the debt incurred being

passed from one generation to the next. The transfer of animals can be of two types: *kalaksime*, which is temporary; or *maar*, which is permanent, but female calves belong to the original owner.

Wild fruits and vegetables⁹ are also occasionally exploited during times of drought, with some being available during the drought itself (depending on severity) and others having to be collected prior to the drought during the rainy season and then preserved for use later. Some of the wild fruits mentioned include *khona*, *damog*, *baar*, *bejelo*, *akhai* and *medeer*, the latter an orange berry which has the added property of “increasing the manhood” of any male that consumes it. Wild vegetables include tubers such as *sumalele*, which is boiled in water and mixed with salt and milk to form a porridge; *buri*, which is boiled in water until soft; and *hinady* and *rumay*, which are eaten without any preparation. Leaves from the *ng`orodo* plant may also be eaten if available. Such wild food, while not normally a part of the Rendille diet, can nevertheless contribute to survival during times when domestic animals are not able to produce sufficient amounts of milk, the dietary staple. As one Elder notes, “when herding, the children can eat these plants and do not look for more because they are satisfied.”

Not appearing in Table 2 on the following page, perhaps because of its obviousness to our Rendille informants, is the strategy of simply moving one`s herds to areas unaffected by the drought. For example, in 1984 many livestock were saved by herding them to Wasso, an area where pasture and water were still available. Trading livestock and their skins for foodstuffs in the larger centers such as Marsabit and Meru is also a common way of surviving a drought. However, the weakness of the animals, coupled with the distances to these centers and the lack of water and pasture on the way, makes this a difficult task. Not only is it hard to get the animals to a market, but, once there, they are often a “tough sell” because of their poor condition. One old man told us how he would try to hide the poor quality of his goat and sheep skins by tightly rolling them so that traders couldn`t properly check them, and by making sure his goats were given a lot of water to drink directly before a sale so that they would appear fatter and in better condition than they actually were.

Overall, the Rendille Elders we spoke to felt that droughts were occurring more and more frequently in the area. Although famine relief efforts in the last three decades have mitigated the effects of drought to some degree, Elders still feel that it was easier in the past to cope with drought because there was more freedom to move herds to unaffected areas. Now, with raiding and increases in population, this has become increasingly difficult.

Table 2: Historical Matrix of Coping Strategies in Times of Drought, Kargi, Marsabit District, Kenya 1997
drought year

	drought year					
	1984	1970	1949	1910	1890	
coping strategy						
drink blood mixed with animal fat			OO	OOOO		
eat wild tubers				OOO		
eat wild fruit	O	O	OO	OO		

exchange children for meat						000
famine relief	0000	0000	000			
eat own camels	00	0000	000	0000	0000	0000
borrow camels for milk	0	00	00	000	0000	0000
eat own cattle	0	0	0			
trade for cattle to eat					000	00

Key for frequency of strategy use:

0000: very high 000: high 00: moderate 0: low blank: not used

5.6 Animal Health

The following is a very preliminary composite list of camel diseases, along with causes, symptoms and traditional treatments. It is not meant as a definitive record of Rendille/Ariaal ethnoveterinary knowledge, but as an indication of the wealth of knowledge that these men possess in this area of understanding.

Camel diseases

1. Haemorrhagic septicaemia

khanid (Rendille)

ngarlngari (Samburu)

symptoms: swelling of glands.

location/season: certain areas are affected more than others. Animals get it only during the dry seasons, sometimes during the short rains, and rarely during the long rains.

treatment: medicinal tree seed available in Marsabit area called *gadaha* in Rendille and *loysup* in Samburu, although it's not very effective. Another tree seed, called *waranda*, which is available locally is also used, as well as tobacco.

2. Trypanosomosis

omar (Rendille)

saar (Samburu)

cause: from a fly which bites animals in bushy areas.

symptoms: general weakness, animal stops eating, runs around as if crazy, may simply fall over and die.

location/season: camels get it when grazing in bushy areas during the rainy seasons.

treatment: no traditional treatment, although bleeding a full calabash of blood from the afflicted animal may work.

3. Mala (Rendille). No scientific name available.
ngimek (Samburu)

cause: animal gets it from mother's milk, particularly if it drinks too much. Also from being beaten too severely when young, particularly in the joint areas. Disease symptoms aren't seen until later in adulthood.

symptoms: inability to stand up after lying down, animal doesn't feed well, legs become swollen.
location/season: only during dry seasons.

treatment: various medicinal plants used, including

- *oda*: tree bark is boiled and animal is given resulting water;
- *dolo*: twigs from tree are boiled and soaked, then this water is mixed with the urine of young boys (because of its "pure" quality, since boys have never been with a woman).
- plain sheep's milk.

4. Camel Cough

yahar (Rendille)

lchama (Samburu)

-no information recorded.

5. Camel Pox

afturo (Rendille, Samburu)

cause: eating trees (acacia sp.) with sharp thorns, which damage the mouth.

symptoms: small wounds which first appear on mouth and head first, with sores appearing later over entire body, accompanied by swelling.

location/season: dry seasons, rarely during the rains.

treatment: no medicinal plants used.

- apply animal fat to wounds to soften them so they don't crack open;
- cauterize wounds around mouth.

Cattle diseases

Following is some very preliminary data on cattle diseases, taken mostly from an interview and PRA exercise with a group of men from Ngurunit.

1. Contagious bovine pleuropneumonia (CBPP)

lkibei (Samburu)

cause: cattle contract the disease in certain areas of bush.

location/season: rainy seasons only, in certain areas of bush. Cattle do not get it in the Kaisut Desert region, because of the salty conditions (plants and water).

treatment: tobacco is used, but is not very effective. A better treatment is to take afflicted animals to the Kaisut Desert, where salty conditions there will quickly cure the animal.

2. Anthrax

lokochum (Samburu)

treatment: a very effective treatment is to rest animal for two days giving only tobacco with no water.

3. Foot and Mouth Disease (FMD)

lgulub (Samburu)

treatment: take animal to Kaisut Desert, where salty conditions will cure.

4. Black Leg

nengeju, nengima (Samburu)

treatment: cauterizing glands with hot iron is sometimes effective.

As can be seen in Tables 3 and 4 below, most diseases tend to occur during the dry seasons (*lami yoda* and *lami dorop*), when, as we were told, animals are weakest due to shortages of water and quality pasture. A few diseases, though, notably trypanosomosis (*saar*) and contagious pleuropneumonia (*lkibei*), occur during the rains, and this is in keeping with explanations of their cause (e.g. that they are contracted in bushy areas where animals are grazed during the rains).

Table 3: Rank and Seasonal Incidence of Most Important Camel Diseases, Ngurunit, Marsabit District, Kenya 1997

	Disease Name	Season				
		long dry	short rains	short dry	long rains	
				Oct. to Dec.	Jan. to March	March to June
local	<i>lami yoda</i>	<i>ltumiren</i>	<i>lami dorop</i>	<i>ngerngerwa</i>		
	haemorrhagic septicaemia	<i>ngarIngari</i>	ooo	oo	oo	o
	trypanosomosis	<i>saar</i>		ooo		ooo
	mala	<i>ngimek</i>	ooo		ooo	
	camel cough	<i>lchama</i>	ooo			

camel pox	<i>afturo</i>	ooo		oo	o
-----------	---------------	-----	--	----	---

Table 4: Rank and Seasonal Incidence of Most Important Cattle Diseases, Ngurunit, Marsabit District, Kenya 1997

	Disease Name			Season		
				Oct. to Dec.	Jan. to March mm	March to June
				short rains <i>Itumiren</i>	short dry <i>lami dorop</i>	long rains <i>ngerngerwa</i>
	contagious bovine pleuropneumonia	<i>Ikibei</i>		oo		oo
	anthrax	<i>lokochem</i>	ooo		oo	
3	rinderpest	<i>lodwa</i>	ooo			
4	enterotoxemia	<i>nolgo</i>			ooo	
5	foot and mouth disease	<i>Igulub</i>	ooo			
6	black leg	<i>nengeju</i>				ooo
7	trypanosomosis	<i>saar</i>	o	o	o	o

Key for Disease Frequency:

ooo: high oo: moderate o: low blank:: never
*local Samburu names in italics

6. CONCLUDING REMARKS

In conclusion, we would like to revisit the general objectives as stated at the beginning of this report in order to summarize our accomplishments relative to each, and to offer a few recommendations for future DMP research based on lessons learned in the field.

Introducing the DMP to Local Leaders and People

While we were able to do this at an informal level, we will have to, in the near future, hold a more formal *baraza* or village meeting where DMP representatives from KARI and other partner organizations can explain the proposed research in detail to the whole community and incorporate any feedback into project planning. Prior to this, a meeting with Rendille leaders from each of the

settlements chosen as benchmark sites should be arranged, so that project documents can be presented and discussed.

Begin to Establish Rapport in the Community

We believe that we “got off on the right foot” in this regard, but we must make arrangements soon for more formal agreements with communities on compensation for participation, protection of rights to knowledge and dissemination of knowledge back to communities. These issues could be discussed with community leaders, using several guidelines developed recently by various sources.

Test some PRA Data Collection Techniques

The group exercises we used proved to be good for acquiring a large amount of data in a short period of time. We must now focus on a more systematic investigation and develop some very specific objectives along with data collection techniques that will allow us a more in-depth understanding of the IK associated with desertification. Regarding the PRA approach itself, we must include women facilitators on the team in order to more easily access the knowledge that Rendille women possess. Eventually, we should train local women and men in PRA techniques, so that they can carry out the research in their communities themselves, not only contributing to local capacity-building but to the collection of more accurate data as well. Finally, we must ensure that sampling takes into consideration the differentiation of knowledge between individuals based on gender, age, experience and other factors.

Collect Background Data on IK of Animal Health and Range Management

As is evident from this preliminary survey, the local Rendille and Ariaal pastoralists have a deep awareness of the causes and effects of environmental problems in this area of Marsabit District. They possess local knowledge of weather patterns, animal species and their behavior, plant species and their uses, range and water management, animal health, and resource conservation which would be of indispensable value for any plan for sustainable use of resources in the region. The data we collected during this field trip will act as a “point of departure”, enabling us to ask more detailed, focussed questions as the research progresses. Eventually, we should develop a minimum data set for each benchmark site, in order to standardize methods and facilitate comparison of data later on.

Test Software Systems for Recording IK

All maps appearing in this report were digitized using the **Map Maker** software, and this appears to be a promising system for the DMP to utilize¹⁰. The program itself takes up very little disk space (fits on one disk), is relatively inexpensive (\$50.00 US per copy for student version) and

can run on a 386 computer. However, it is somewhat difficult to learn even with the manual, particularly for beginners like ourselves with no background in GIS, and we were often frustrated when we were unable to carry out certain functions. Although some of these problems were caused, as we later learned, by the use of a defective version of the software¹¹ (for example, we couldn't use the "create legend" function, or save all "layers" and "furniture" of a single map in the same file), it seems that a person with a fair level of GIS training would be required to get the most out of this program. Our use of the software, as can be seen by the maps in this report, was limited to the relatively simple task of recreating the rough sketch maps of the territory made by local people. It was not necessary for us at this stage of the research to use any of the higher functions the software has to offer, such as importing and using base maps, or linking data to maps and map features. A tutorial run by an experienced GIS user will be required if this software is to be used effectively by DMP participants.

For textual data we are using **ICONS**, a Windows-based information management system specifically designed for IK data. ICONS basically uses a spreadsheet format to organize textual data related to IK projects. It is broken into eleven modules, each of which represents a major category (e.g. geographical areas, peoples, etc.). Within each module, information is stored on records and sub-records, which are displayed in a form format showing various pre-set fields. External sources of data, such as word processor or GIS files can be attached to these records and sub-records and displayed in a special window contained in the record, either as icons or as full representations. Map Maker proved to be compatible, and we were able to both attach and display several map files in the appropriate records. The system seems quite flexible, although it is not possible to alter the fields displayed on each record, nor is it possible to add (or delete) category modules. This is a bit of a problem, since this pre-set structure may not fit with how the user wants to organize the data. For example, we found that some fields appearing on records were not applicable, while on the other hand we were not able to add more relevant ones. As well, some of the category modules will go underutilised (e.g. "Internet sites" and "Internet services") in our research while others, particularly the "peoples" module, would benefit from a division into separate modules which could better handle the complex data associated with this category.