

Commission on Nomadic Peoples

“Environmental Education for Sustainable Development among the Nomadic Peoples: The UNESCO-IPAL Experience in Northern Kenya”

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Nomadic Peoples, Number 30, 1992

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Environmental Education for Sustainable Development among the Nomadic Peoples:

The UNESCO-IPAL Experience in Northern Kenya

Gufu Oba

This paper draws together the experience of a long period of environmental work among the Rendille nomads of northern Kenya, by the UNESCO Integrated Project on Arid Lands (UNESCO-IPAL). Indigenous knowledge was used as a basis for planning education and training. IPAL researched a successful education and training programme well suited to the pastoral development context. Various forms of educational media, such as radio, public communication and demonstration on environmental rehabilitation, improved livestock management, and people's participation in development were successfully tested for their suitability. It is hoped that some of the experiences will serve as a useful lesson for other combined research and development projects among the nomadic peoples of Africa.

Introduction

The arid and semi-arid lands (ASAL) of Kenya make up about 75% of the total land and are inhabited by diverse groups of nomadic pastoralists and agro-pastoralists, who comprise between 15-25% of the country's total population (currently estimated at 25 million). The nomadic pastoralists own over 30% of Kenya's cattle population, 69% of the goats, 66% of the sheep and 100% of the camels (Resource Journal, 1989). On the basis of the type of livestock managed, two cultures have emerged; the "camel" and "cattle culture" (Schlee, 1989). Among the two "cultures", value of property, dowry, important ceremonies, social obligations and insurance are expressed in terms of cattle or camels.

The people of ASAL suffer from multiple constraints. Rapid growth in population, which has doubled in the last three decades, and recurrent drought that has decimated livestock population (forcing the inhabitants to depend on food aid) have traumatized the nomadic peoples. The principal problem is environmental degradation and the

eroding of their ecological resource base. Historically, the problem of environmental degradation was less profound because of low population pressure and mobility which allowed the land to be rested periodically. In addition, many pastoral communities have expanded their home grazing range through raids and wars on their neighbours. Within the expanded home grazing range, they had sufficient pasturage and water resources to fall back upon during periods of drought. But at the turn of the century following colonization, there was realignment of borders and strict control over livestock movements. Moreover, during the post-independence era, the nomads lost control of critical dry season grazing areas to wildlife sanctuaries and this has had serious environmental implications.

Other causes of degradation resulted from population movements from high potential areas into more marginal zones, where cultivation of land combined with overgrazing resulted in serious deterioration of the land. Furthermore, development ventures were aimed only at solving incidental problems. For example, disease con-

trol was seldom followed by organized marketing, while irrational water development policies aggravated problems of overgrazing. Traditionally, the more marginal areas were grazed periodically during the wet season. Short duration grazing left forage plants with sufficient food reserves for the next growing season. The presence of a permanent water source on the other hand encouraged continuous use causing environmental degradation. Degraded environment has a low productive capability and therefore cannot support an increasing human and livestock population. When this happens, even a normal dry year becomes "a regional" drought, while during actual drought, high livestock mortality repeats the spiral of hunger and destitution (Oba and Lusigi, 1987).

Another dimension of the environmental deterioration in Kenya's ASAL is attributable to the reduced mobility of the nomadic population. The formerly nomadic groups are rapidly becoming settled. Consequently, in and around the settlements, woody resources are consumed faster than they can regenerate (Lamprey, 1981). Therefore, although largely underdeveloped in economic terms, if the present trends of environmental degradation continue unabated, ASAL may become a liability rather than an asset for the national economy.

Urgent measures must be taken to ameliorate the situation. In the past, lack of development has been attributed to low economic potential, poorly developed infrastructure and sociological factors. Sociological issues have commonly been cited as a significant antecedent to development failures. Lack of development has been attributed partly to the nomads mode of land use (Little and Bronkesha, 1987). Thus, the official position on development was to settle them. Moreover, the nomads are professed to suffer from what Herskovits (1926) has called "cattle complex". Such perception ignores the fact that they have evolved rational land use strategies based on mobility. Furthermore, contrary to a

common presumption, the nomads of Kenya have developed cultural institutions which ensure proper use of the range. It is only when external factors over which they have little control infringe on their rights and freedom, that the ecological balance is tipped.

Previously, efforts to develop ASAL concentrated on enforcing destocking and conservation measures to which the local nomads were vehemently opposed. Where grazing programmes were implemented, indigenous land use methods and socio-cultural dispositions were ignored. However, development planners and policy makers are now acknowledging the necessity of local participation for success in development (Niamir, 1990). This requires appropriate media to disseminate the necessary information from resource users to planners and vice versa. Public education has this role to play. Since development of ASAL involves communities as well as individuals, educational development entails sharing and transmitting information, developing skills and appropriate attitudes, improving services, mobilizing local organizations and motivating the local leadership.

Plans for providing education for the nomadic population of the country have been prominent on the development agenda in recent years. Education is regarded as an appropriate media for changing nomads perception and value systems, while integrating them into a broader socio-economic and political context. A major deficiency in establishing education has been attributed to their dispersal and constant mobility. Logically, resettlement has been upheld as a strategy for providing both formal and non-formal education (Heron, 1983; Dido, 1985; Ibrahim, 1981; Nkinyangi, 1981). The common school curriculum, notwithstanding, had little relevance to the traditional way of life (Dido, 1985; Ibrahim, 1981). Among the adult population too, illiteracy is higher than the national average (Allen, 1981). Education for the adult population cannot, therefore, be accomplished through

written materials, but may rather be organized through public education aimed at boosting environmental awareness (Ibrahim, 1981). The model of education should be related to the people's socio-economic and environmental predisposition which essentially involves "tapping into their environmental psychology".

The means for transmitting environmental education has been via a wide range of extension services. For example, a development programme with major emphasis on soil erosion control, for example, teaches and demonstrates methods of gully control, tree planting and terracing of hill slopes, while a rangeland grazing project is concerned with regulation of stock movements, management of natural pastures, control of livestock diseases, livestock marketing and water development. A family health care project on the other hand is concerned with teaching and demonstration of methods for improving family health and child care and a forestry project is concerned with planting of trees and protection of natural forests. All targeted at the same audience but uncoordinated in their operations.

Extension services designed for the nomadic communities have therefore had little impact and at worst failed, for various reasons. There are extremely few extension workers with a nomadic background. Most extension workers are from agricultural communities, trained and equipped to serve farmers but ignorant of the socio-cultural values of the nomadic peoples and the environment they inhabit. Moreover, lack of knowledge of the local dialects have compounded communication difficulties. Most importantly, extension workers patronize the local nomads whom they tend to regard as less informed and simple. The nomads, conversely, consider that the extension workers spend too much time on trivial matters, while ignoring substantive issues.

Extension services are largely confined to main settlements, while mobile pastoral camps remain out of reach. If mobile services exist, they are usually accessible only

by road, but because of the generally poor conditions of roads in the region, especially during the wet season, extension services fail to fulfill the needs of the majority.

Another factor constraining extension services is the way extension programmes are organized. Various government institutions, church organizations and development projects provide services to the local community. As already mentioned, the fragmented nature of extension work causes duplication of activities and produces conflicts, which hamper the effectiveness of extension work. Furthermore, extension workers are trained specialists but are unprepared to tackle the multiple problems confronting the nomads. The nomads themselves are generalists, knowledgeable in livestock management, livestock diseases, sociological issues, and local history. Consequently, it is unhelpful to send them technicians who cannot provide comprehensive survival tools, but bits and pieces of information. A major limitation of extension work is lack of mutual trust. The nomads in general are suspicious of experimenting with new ideas (Kerkhof, 1990) and become sceptical if pushed into projects they cannot clearly relate to. As beneficiaries of planned extension they have been likened to "gate keepers" (Decker, 1983). They close on those who make wrong approaches and "open up" when they anticipate benefits. Often, the closure of the "gate" is attributed to a breakdown in communication, between the people and the projects on one hand, and the people and extension workers on the other. Nonetheless, the nomads are usually blamed for such failures. In addition many extension programmes lack the flexibility which is essential for success. Most importantly, many development/education programmes are not evaluated, wasting valuable experience emanating from many years work, while mistakes are repeated over and over again.

This paper reports the experience of environmental education and development among the Rendille nomads of Marsabit District, northern Kenya. The work of the

UNESCO Integrated Project on Arid Lands (UNESCO-IPAL) and the pre-extension/development phase of the West Marsabit Integrated Development Pilot Project (WMIDPP) are presented as a case study.

Background to the UNESCO-IPAL Project in Northern Kenya

Similar to other ASAL areas, northern Kenya continues to experience environmental deterioration. Rapid population growth and diminishing range resources, combined with poor distribution of water, have led to concentration of population in 14% of the region, while the rest of the area remain unused (Lamprey and Yussuf, 1981; Lamprey, 1984). In the areas of population concentration, greater demands upon woody vegetation and pasture are made. Herbaceous vegetation is progressively depleted, while overbrowsing of young trees by livestock has a detrimental effect on tree regeneration potential. In the settlements of Kargi and Korr (Map 1), for example, tree materials required for construction of livestock enclosures are currently in short supply.

The UNESCO-IPAL project was part of an international effort to combat desertification and attempt to reverse environmental deterioration through scientific research, training, and environmental education (Lusigi, 1980, 1981, 1988). The programme was launched under UNESCO's intergovernmental programme on Man and the Biosphere and "represents an effort to provide scientific basis for a holistic and integrated approach to combat desertification and improve living conditions of pastoral people" within the arid and semi-arid lands of northern Kenya (Lusigi, 1986:279). The activities of IPAL were preceded by the Traditional Livestock Management Project (TLMP) between 1976 and 1978. After 1978, the two projects were merged and funded in three 3-year phases. The United Nations Environment Programme (UNEP) provided initial funding up to 1980, and subsequent phases were

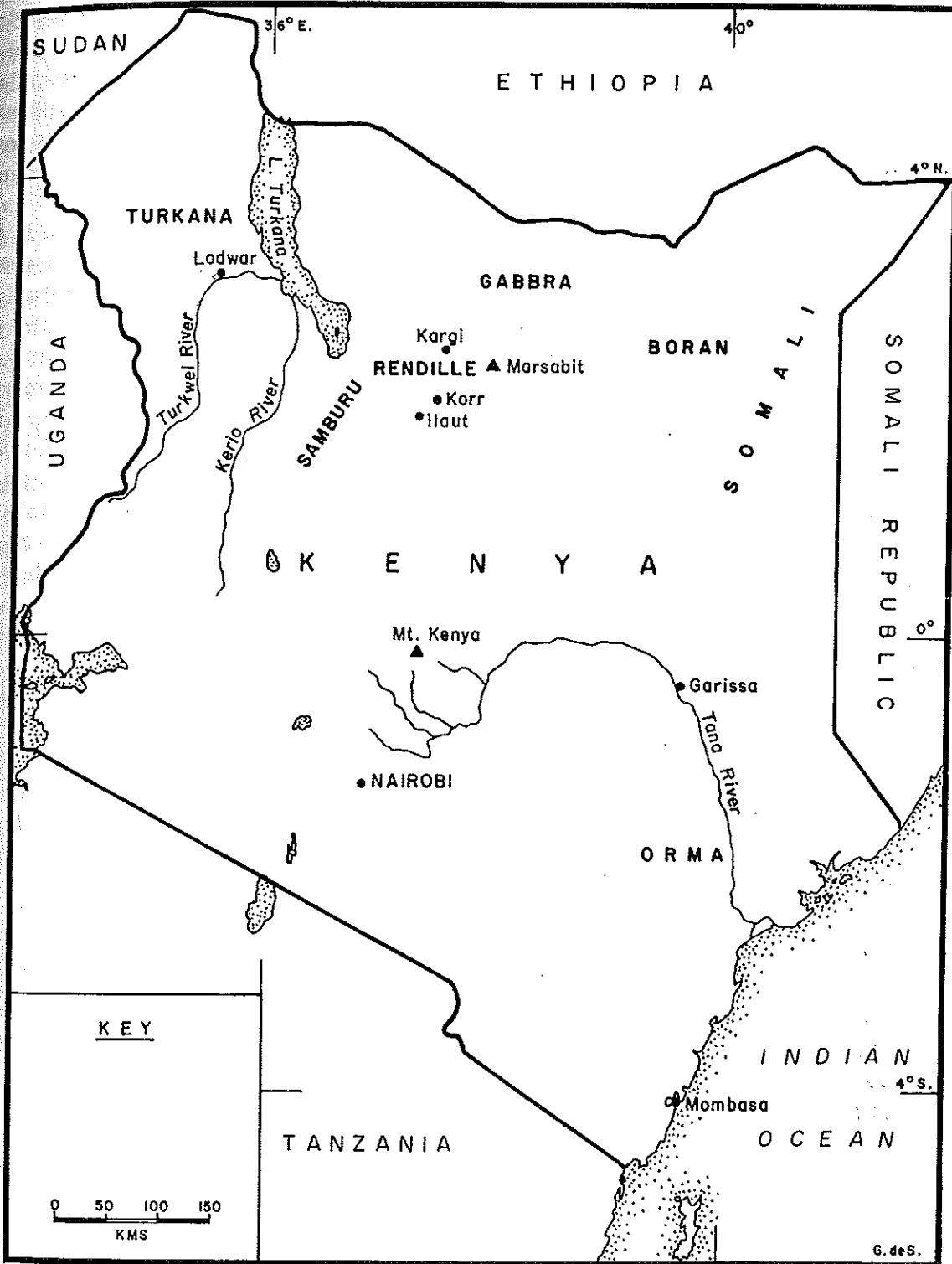
supported by funds-in-trust granted by the Federal Republic of Germany. Subsequent to the review missions of 1981 and 1983, IPAL was recommended to use its research findings to prepare integrated resource management guidelines for the West Marsabit District and to establish a national institution which would supervise their implementation. The Kenya Arid Lands Research Station (KALRES) was formed to carry out the task between 1984-1987. It was under the auspices of KALRES that the activities of WMIDPP were started in 1985 (see below). Study of the people's history, their environmental perception, future aspirations, social organization and natural resource use was central to the project's multidisciplinary research, which comprised human ecology, livestock ecology, range ecology, woodland ecology, climatology, geomorphology, soils, hydrology, pastoral economics and education and training.

The IPAL study area (of 22,500 km²) covered the home territory of the Rendille, the Gabbra, the Borana, and the Samburu nomads. The region is used for extensive grazing by herds of camels, cattle, sheep and goats and some wildlife. Although a large proportion of the human population is settled, livestock movements between traditional dry season and wet season pastures are still practised.

The IPAL Educational Programme

It was IPAL's assumption that rehabilitation and management of the rangeland resources of northern Kenya could be accomplished only if the nomadic people themselves actively participated, and cherished what was being done. Their participation can be increased through environmental education, defined here as transmission of information and training on aspects pertaining to the local environment, including pasture status, water, soils, livestock management, livestock diseases, livestock marketing, human health, environmental conservation and rehabilitation. This should be based on in-

Map 1. Map over Kenya with the study area



indigenous knowledge and perceptions. Technological inputs become necessary in so far as they improve communication.

Indigenous Knowledge and Rationale for Environmental Education

Environmental education was seen by IPAL as the channel through which the nomads could be assisted in the rehabilitation and development of their own environment. Solutions to local problems could also be realised in this way.

It was also understood that nomad survival is attributable to diverse strategies designed to make optimal use of pasture and water resources. During droughts, the goal of each family is to secure survival of its herds and feed itself. The indigenous knowledge of drought provides a better perception of survival strategies, including the indigenous social security system, and why some of them are no longer operative (Oba and Lusigi, 1987). Environmental education provides the medium for discussing issues related to drought survival.

Furthermore, the nomads have considerable knowledge of local soils and suitability of range sites for different livestock species. Place names often reflect the most common soils in the locality. Most importantly, each nomadic group has a description of degradation in their local dialect. Often degradation implies loss of vegetation. Studies of people's environmental perception have in some cases noted contradictions between people's indigenous knowledge and the present environmental reality. For example, the Rendille nomads do not believe that there is a direct connection between loss of trees and loss of top soil (Oba, 1985a). Rather than being ignored, these missing links in people's environmental perception should constitute the point of entry into planning proper environmental education. It may be necessary for environmental education to demonstrate the relationship between the well-being of vegetation cover (the nomad's prime resource) and protection of soil. This is extremely important when

planning soil rehabilitation work where measures to control soil loss must first take account of the people's perception of soil and its uses. In contrast to farming communities whose knowledge of the soil is in terms of crop yield, for the nomads soil relates to the condition of pastures and livestock. Until the local pastoralists are able to appreciate the relationships between loss of top soil and vegetation productivity, construction of soil erosion control structures are of only limited significance.

The most enigmatic perception is the belief that some rangelands even when they are degraded fatten livestock in comparison to others where, regardless of pasture conditions, animal health continues to deteriorate. This condition of the range is referred to by different names by different groups. The Rendille call it *fuur* (the one that fattens). These areas are severely overgrazed, in comparison to others. Environmental education should, for example, improve people's awareness about such contradictions in their perceptions.

The nomads are renowned naturalists. Their ethno-botanical knowledge is enormous and their use of tree resources diverse. Among the Turkana nomads, for example, tree resource management of *ekwar* is a well developed silvo-pastoral system (Barrow, 1988, 1990). Indigenous knowledge of trees should provide a basis for tree conservation. The Rendille nomads too, use the natural vegetation to classify their rangelands into what they call "the cattle country", "the camel country", "the sheep and goat country". This type of classification may have more practical value than a scientifically based classification.

In the study area, rehabilitation measures were urgently required to restore land to productivity. Soil erosion control and tree planting have generally been unsuccessful. In contrast to farming communities, the nomads have no tradition of soil erosion control works and tree planting. They are, however, more likely to participate if they are involved in conservation of the indigenous vegetation as an alternative measure

to tree planting. Nevertheless, there are conflicts in attitudes with regard to tree exploitation. First, there is a widespread belief that trees are an infinite resource (Oba, 1985a). Second, the goal of each herder is to meet short-term needs, while long-term environmental conservation is not of immediate concern. The function of environmental education and training is to help the nomads develop attitudes positively disposed towards natural resource conservation.

In addition, range and woodland ecology studies have clearly demonstrated the adverse effects which the human population is having on vegetation resources. Consumption of woody resources by the settled households has been estimated at 423 kg of wood per year (Walther and Herlocker, 1981). At this rate, woody resources are expected to be removed from the neighbourhood of most settlements in a short period of time (Lamprey, 1984). The problem is, however, still limited, and could be overcome if patterns of wood use were evenly distributed and alternatives for livestock enclosure found. Environmental education and training can provide people with such alternatives.

The Rendille nomads still depend on their livestock for survival. Livestock productivity, breeding and marketing have been affected by frequent outbreaks of contagious diseases. Parasitic worms in particular have a debilitating effect on livestock health. Regular drenching increased productivity by 18% and reduced calf mortality from 46% to 10% in camels (Field, 1984). The nomads are often ignorant of the damage done to their livestock by gut worms. Furthermore, campaigns to eradicate contagious diseases have not always been successful, while imposed quarantines have had a serious impact on livestock marketing. Public education improves understanding of livestock diseases and their control.

Most importantly, the prosperity of the rangelands could be increased rapidly if livestock were properly marketed. Although livestock plays such a key role in the

livelihood of pastoralists, existing poor marketing structures have robbed them of potential income. Studies of pastoral economics have attributed this to chains of middlemen, and poorly organized and irregular marketing (Njiru, 1981). To improve the situation, it would be necessary to involve the pastoralists in the marketing of their livestock and to train them in business ventures. Furthermore, if land degradation in and around settlements is to be halted, it is necessary to discourage people from moving their livestock into settlements, by extending services to more remote camps.

The Target Population

Environmental education planning must be preceded by identification of the "target" population. Among the nomadic communities, as among the farming population, there are "functional" groups with different levels of organization and different responsibilities. At the community level, elders are the decision makers. At the household level, the senior male serves both as a manager and decision maker. The unmarried sons or *morans* look after *fora* herds (composed of non-lactating females, males, male castrates, immature and pregnant animals) far from the base camp. They are assisted by unmarried girls and adolescent boys. Although the latter group has no authority, it constitutes an important population on whose skills and attitudes future environmental conservation will depend on. At home, the women are managers of household produce, they are responsible for the distribution of consumable resources and attend to other chores. Extension workers should recognize the importance of this division of labour among nomads since it affects the sort of message planned. Other functional target populations include the daily gathering of elders, traditional assemblies, women's groups, literacy centres, nomadic camps, influential individuals and the administrative *baraza*¹ (Oba, 1985b).

IPAL's Public Relations Work

IPAL's education and training activities were founded on its public relations work. Local public relations officers were sent to all nomadic camps in the study area during the initial phase of the programme (Field, 1976). Meetings with elders and prominent personalities were organized through informal interaction. From the outset, it was important that people recognized the function of the project as that of research, although its results were expected to be utilized for development. This, nevertheless, did not minimize people's expectations.

The Literacy Survey

The nature of an education and communication medium depends to a large extent on the literacy level of the target population. For this reason, IPAL's education and training activities were preceded by a district-wide literacy survey, which aimed to establish the literacy level, identify the types of communication channels used in the literacy centres, modes of instruction, availability of suitable reading materials, customary barriers to adult education and level of attendance (Oba, 1981). Despite the nationwide literacy campaign, illiteracy among the nomadic population exceeded 80%. In the 28 literacy centres throughout the district, 59% of those attending were women and the remainder men, boys and girls. Of the female participants, 63% dropped out before learning how to read and write, while among the men only 7% dropped out. The women blamed the high dropout rates on domestic chores including child care, cooking, firewood collection, fetching of water, herding, and watering of livestock. Men, on the other hand, blamed labour demands and mobility. In general, the literacy campaign was limited to settlements. Additionally, only 4% of the subjects taught at the literacy centres were of relevance to environmental concerns.

It became immediately clear to IPAL that it could not rely on the literacy programme

alone to disseminate information to the larger nomadic population. This choice must depend on a mode of communication easily available to the majority. In the IPAL study area, communication in general was constrained by a multitude of factors, including poor road networks and inaccessibility during the wet season, mobility of the people, dissimilar local dialects and frequent hostility between neighbouring groups. Success hinges on finding suitable communication channels, flexible enough and far-reaching.

Communication Channels in the Study Area

Diverse forms of communication channel exist in the study area. The most popular form is person-to-person communication. By this method, important news can be communicated rapidly, over a wide area. But usually, the main source of information is when people gather to discuss issues of common concern. These gatherings attended by elders from different camps result in messages being communicated back and forth. A modified form of the traditional gathering is the administrative *baraza*, called to discuss administrative and political matters. Unlike the traditional gathering where people actively participate in the debate, participants act as passive listeners in the *baraza* communication. Therefore, the *baraza* has serious limitations as a method of communication. In contrast to the *baraza*, the traditional gathering offers several benefits (Oba, 1985b).

Traditional Mode of Decision Making by the Rendille Nomads

The Rendille nomads, who according to the 1979 census number 19,000 individuals, comprise several clan camps which they call *gob* (Beaman, 1981). People of the same *gob* have common goals. They share labour and cooperate in marriage matters and other social issues. Clan solidarity manifests insurance against livestock loss. In a way, each clan settlement is administratively unique,

with elders of each *gob* involved in decision making. Each *gob* has a leader (*eti-gobiwen*), who is assisted by a council of elders (*lamal*). Although they lack hierarchical leadership, the Rendille have influential elders (Beaman, 1981), whose support is crucial to the success of development projects and therefore also crucial for IPAL.

The Naabo, a Place of Traditional Gathering

Two customary gatherings where decisions are made are the *naabo* and the *gei-makhabale* (tree of elders). *Naabo* is a central enclosure around which *gobs* are built. It has religious, administrative and political significance. Whenever a new camp is located, the *naabo* enclosure is constructed first. The fire used by the whole camp is lit here first before being distributed to all households. This probably symbolizes sharing of the good things of life. The *naabo* is also a site of fertility rites. A woman who fails to bring forth children is allowed to erect her hut close to the *naabo* from where elders recite prayers on her behalf. The *naabo* also serves as "parliament". The *naabo* gathering is held every night, after livestock have returned from the day time grazing. All *naabo* proceedings are preceded by prayers. During discussions, opinions are expressed by participants, speaking in turns, adding new ideas to the debate or supporting the viewpoint of others. Even when conclusions emerge, deliberations are continued for the benefit of late-coming elders. The final resolutions are transmitted back to respective households by participants. A text of the *naabo* proceedings of the *Gabanoyo gob* in Kargi, recorded in 1983, is given below as an illustration. The names of elders have deliberately been omitted.

Elder 1: I am the one who called for this *naabo* gathering having three reasons in mind; first the *sorio*² is over and therefore our camels should go back to *fora* camps, second, the government is issuing identity and voting cards and some people in our camp have not yet been issued with these, third, as you know, this is our *almatho*³ camp site and it is not our custom to perform two such

ceremonies in the same place. All these issues affect our lives and we must resolve them together. As you are also aware, we cannot move on any day but on the Monday of each week. Since tomorrow is Monday, I thought it in order for this gathering to decide on the changing of camp site. I also understand that there is an elder who is ill but I hope this will not hinder us from moving. So, let us discuss these and any other issues and reach consensus on what needs to be done.

Elder 2: Everything you have said is true. As you all see, we Rendille people are moving less and less year by year compared to what we used to do. In this particular site we have been for over a year. This is unusual, but I think it is time we moved. We also realize that all sites are not suitable, and at some sites *boma* building materials are not available. These materials cannot be brought to a new site without the use of camels, if our camels are also returning back to *fora*, how can we perform this?

Elder 3: It will be much easier for us to move while our camels are still in the main camp; so that we use them to transport livestock *boma* materials.

Elder 4: I agree with this suggestion, we shall have no difficulties changing to another site while our camels are still here; they will not only assist us in bringing in *boma* materials but also carry household goods to the new site. This will be of great assistance to our women who often have to carry the household items themselves.

Elder 5: We all agree that moving is necessary, but where should we move to?

Elder 2: You remember our old camp site; it is now clean, as the manure and dung has been swept away by floods and wind. I suggest we settle there, since it is just within walking distance.

Elder 3: I don't think our old camp site is ideal; it has strong winds and is liable to flooding, it is also stony. Why shouldn't we consider the area next to the *Galdeilan* camp, there is an excellent site there.

Elder 6: I am surprised that you suggest us moving back to the old camp site. I strongly recommend that we move a good distance into areas where we have adequate pasture for our camel calves and goats. Lack of loading camels or women to transport household goods should not be an excuse, the lives of our livestock are paramount and priorities should come in that order.

Elder 5: "Edema" has a good point, let us not consider such ideas too remote because of problems of transporting things to the new camp site.

Elder 7: You all remember, "Keriyo" had mentioned that there is a very ill elder, what can we do with him if we are to move?

Elder 3: It is possible he may be carried by camel to the new site.

Elder 1: Let us make a ground survey, for all sites mentioned. Movement tomorrow will not be possible by the looks of things; I have just been told of a sick child. Let us wait for the sick to recover and meanwhile we decide on a site. Now let us discuss the identity cards. I was with the chief this afternoon and he asked all the committee members to carry this information back to their camps. All people over 18 years should receive national identity cards. Voting cards should also be collected. We understand the time for the politicians are up and they are coming back to us again. You have seen how they were following each other by vehicle today (elders laughed). Some of you do not see the importance of the voting cards, but I think they are important. It is our only opportunity to remove all those who are not working for the Rendille. Therefore, ask your wives, *morans* and girls to get voting cards. Without them they cannot vote.

Elder 5: Do people who have the old cards need new ones?

Elder 1: No, you can still use the old card, but we can confirm this from the chief tomorrow.

Elder 8: We have not yet resolved, whether we shall allow our camels to go back to *fora* or not. I understand all the camels of the neighbouring camps are moving tomorrow.

Elder 9: It is important we call our *morans* to confirm where they wish to move the camels.

Elder 1: This is quite true, we cannot make any decision on this until we have heard from them. Many of them are not in the camp right now, let us call them first thing in the morning. Does anybody wish to add anything else?

Elders: No.

Elder 1: May *Waqah* (God) bless our livestock, our present camp site and our people.

Although dissensions were rare at the *naabo* deliberations, elders confirmed that if they occurred they would be resolved by the *lamal* council. The decision of the *lamal* council is usually sanctioned, but if disputed, the contester is threatened with a curse. A curse among the Rendille is a formidable psychological retribution which serves to seclude rebellious individuals, while re-affirming the authority of elders. Some elders who were believed to have potent curses used it to their advantage. During parliamentary and civic elections, they intimidated all those who were opposed to candidates of their choice, thus influencing the outcome of the elections.

Although *naabo* assembly took place every night, quorums were seldom reached. Absence of prominent elders or loss of animals were the reasons for lack of quorum. The *naabo* as a place of gathering is accessible only to married men. *Morans* may be allowed when called upon for consultations on livestock movements. Women and children on the other hand rarely participate although their interests can influence the decisions taken. Pastoralists women in general, and the Rendille women in particular are usually responsible for the more arduous tasks involved in maintaining their households.

The *Gei-Makhabale* Assembly

Gei-makhabale are places where elders of the neighbouring *gobs* meet to deliberate issues of common concern, subsequently followed up by additional discussions at the *naabo* of each camp. IPAL's extension workers and consultants attended these gatherings to debate on the activities of the programme. These discussions were critical, especially during the compilation of the resource management guidelines (see below). This notwithstanding, one must be aware of the diminishing authority of elders among the nomadic communities in general. In the study area, development projects were decided upon by the administrators and planners. In principle, the policy of district focus for rural development is expected to change this but in practice efforts to increase local participation have not been very successful. This state of affairs complicates extension work and places projects like IPAL in jeopardy.

Education and Training Media for the Pastoralists

In its research and development agenda, IPAL was commissioned to conduct studies and test educational media for suitability for the nomadic audience. The following were among the media tested.

Radio Communication

The radio was the most important medium tested for communication to a wider group. The rationale for the radio test case was in recognition of the fact that successful implementation of development and rehabilitation of degraded lands depend on people's willingness to participate and to increase information necessary to sensitize the public on environmental issues" (Allen, 1981). A sample of 12 camps in different locations of the study area was randomly compiled and used for the radio test case. Prior to the test, interviews were conducted to determine people's awareness of IPAL's work, levels of environmental concern and traditional land use strategies. Each sample camp was supplied with a short-wave radio for the duration of the programme. The broadcasts were conducted in cooperation with the Voice of Kenya (VOK) on the Rendille vernacular service for 15 minutes, twice a week. The programme included short discussions with prominent pastoralists on herd management and environmental problems and with IPAL scientists on their activities.

The radio programme presentations were evaluated during each session for quality of reception and effect on the audience (based on people's spontaneous reactions). At the end of the test period of 6 months, the whole exercise was re-evaluated. Prior to the radio test case, only 11% of the people (n=106) interviewed had radios, compared to 24% (n=119) subsequent to the test. About 79% of those asked gave favourable rating to the radio programme, while 89% wished for its continuation and 90% confirmed acquisition of new information (Allen, 1981).

After the trial period, the programme was translated into the Borana (Oromo) dialect and presented on the Voice of Kenya Borana vernacular service for an additional 3 months. The programme was popular and there were requests for its continuation. Since IPAL's task was limited to testing radio as a suitable medium for supplying information to the nomads, the responsibility for

continuance was left with VOK. The programme was unfortunately terminated after 10 months, firstly because of lack of funds and new materials developed for broadcasting, secondly because of the VOK's general lack of interest in issues concerning development in ASAL.

Films as a Communication Medium

Films and videos were rare in the study area. The occasional educational films shown to the public often featured the Australian sheep ranches or the American cattle ranch operations and therefore had little relevance to pastoral life in Africa. Similarly, the *mashambani* films shown by the Ministry of Agriculture had little relevance. These films were used to teach the nomads "good farming techniques", but were inappropriate since their land is too dry for rainfed agriculture.

Nevertheless, there are opportunities for developing films and videos which can effectively be used to educate the nomads in "good" range management. Consequently, IPAL collaborated with other media services (CSIRO and Environmental Concerns International Inc., USA), to test video films as a means of communication to the nomads. In that respect, the IPAL audio-visual test served as an important educational tool for training and informing public about the project's activities.

Slide Projection

Coloured slides provide an exiting means of instruction and can effectively demonstrate land rehabilitation measures if prepared for that specific purpose. Serialized slides were used to illustrate various features of IPAL's work and the local environment. Slide series were designed to elucidate specific aspects. The scripts describing the "stories" of the slide sequence were translated into the Rendille dialect and read by a presenter. There were slide "stories" on soils, vegetation, livestock management, livestock marketing, livestock diseases, human health, water management, use of trees, desertification, and land rehabilitation.

When planning slide "stories", the theme was built around local knowledge and perceptions. The most popular slide series were those on *Acacia tortilis*, the most important tree species in the region. Traditional cultural stories, ceremonies, names of places and people in which the tree featured, were used in the script to underscore its importance. The slide lessons were then followed by verbal evaluation to identify aspects of management which people had not grasped.

Other Modes of Teaching and Training

Pre-recorded discourse in local dialects were also tested for their suitability as a teaching tool. This was similar to the radio as a medium except that it can only be used by a small audience over a limited distance. Radio tapes were suitable for recording interviews with prominent elders or groups, and drama, role plays and traditional songs.

The project was also expected to demonstrate solutions to processes of ecological degradation. In the study area, numerous vegetation enclosures were built to demonstrate recovery potential of the land. In the town of Kargi, for example, where degradation was very severe, vegetation enclosures showed recovery potential after a short period of rest (less than 10 years). This provided an important example for the Rendille of the capacity of their land to recuperate following management intervention.

However, finding alternatives to the traditional livestock enclosures produced challenges. Trials were initially made with live bamboo obtained from the Aberdare Forest, some 500 km from the study area. About 30 pieces (joined in 5–10 m sections) needed for an enclosure cost \$300, with the greatest part of the cost being transportation (Lamprey, 1984). Individual pastoralists and the local chief were asked to demonstrate its practical application.

Although the bamboo *bomas* are proven to be long lasting, they did not appeal to the Rendille. The poor response was prompted by two reasons: first, the bamboo enclosures

were not free, people had to buy them. The Rendille, however, saw no reason for purchasing them whilst they could continue to freely cut trees. Second, bamboo being a bulky material is not easily transportable like the collapsible traditional huts. The trial was eventually abandoned altogether, independently of these results, following a presidential decree protecting bamboo forests throughout the country.

Another alternative was to utilize the plentiful volcanic rocks for constructing enclosures. A stone *boma* to enclose a family's camel, sheep and goats required 36 man-hours to construct at a cost of \$250 (Charles Amuyunzu, pers. commun.). Examples were constructed near nomadic camps to serve as a demonstration. Despite initial optimism, the response was discouraging and stone *bomas* were rejected for two reasons. Firstly, the *bomas* accumulated dung, fleas and ticks, the very reasons for regular changes of camp sites. Secondly, construction of livestock enclosures is not merely a physical exercise; ceremonies must be performed to bless the sites before occupation. Unfortunately, this was overlooked by IPAL. Most importantly, the design of traditional camp sites followed a fixed pattern. In the middle of the camp was the *naabo*. Next to the *naabo* were camel enclosures. Beyond these were small stock enclosures, encircled on the fringe by huts. This arrangement constituted unity in the whole settlement and failure to conform to this pattern was unacceptable to the Rendille.

The Model Pastoralist

In the study area, overall productivity of livestock has been reduced because of disease-related problems. High rates of abortion in camels, loss of milk yield and frequent outbreaks of contagious disease—caprin pleural pneumonia (CCPP) in small stock (sheep and goats), and contagious bovine pleural pneumonia (CBPP) and foot and mouth disease in cattle—constrained livestock productivity. The goal of IPAL's research was to demonstrate solutions.

The most important demonstration of improved management was that of using the livestock of the late Lengima of Ngurunit as a model herd. The Rendille nomads who were approached were generally non-committal and refused to allow their camels to be used in the research programme. They were apprehensive of what might ensue "...from treating their herds with injections". Lengima offered to take the risk. Lengima was a prominent camel owner and although a pure Rendille himself was assimilated into the Samburu culture by his marriages to Samburu wives. His camel herd was contracted by IPAL to be used as an experimental herd, while that of the project served as the control. He himself was used as a model herder.

According to his agreement with IPAL, Lengima was requested to manage the two herds. The position was that his camels received regular veterinary treatment, and he was paid a rental fee of KSh 10 per head of camel per month. Lengima's long-term association with IPAL afforded him and his family life-long training in camel diseases and the application of veterinary drugs. Additionally, he offered his camels for use in trials of new drugs by the drug manufacturing companies. The outcome was immensely rewarding. After 8 years of cooperation with the project, the productivity of his camels was enormously improved achieving an 18% increase (Field, 1984). In Lengima's own words his "...camels finally passed the number 100".

Lengima's camels provided an important manifestation of improved management. The other pastoralists too, requested IPAL to provide them with veterinary clinics. The clinics served as public relations venues as well as centres for practical training. Services for treating sick animals were free of charge, although the nomads were required to pay for drugs at the factory price. IPAL scientists used the clinics to demonstrate simple skills for treating livestock against gut worms, preparation of anti-tick (acaricide) mixtures and their application on small stock as well as camels. The long-

term effect of veterinary clinics was increased popularity of veterinary drugs among nomads in the region (Rutagwenda, 1983). Thus, it can be said that Lengima's prudence as a model herder had a significant influence on other herders.

Leadership Training and Workshops on Environmental Education

After initial field research, the findings of the project were disseminated to the local leaders and extension workers via training seminars and workshops (Oba, 1982, 1983). The community leaders approached were chiefs and local elders. The chiefs, who are government appointed, and the elders are responsible for making decisions in their localities. The chiefs in particular have legal powers to implement proper use of local land resources. Moreover, the chiefs and elders are closer to their people than extension workers and are therefore better placed to understand people's needs. In addition, they are knowledgeable about the local environment and may have answers to some of the problems (Oba, 1982:1).

Consequently, several training workshops of one to two weeks were organized, with the aim of providing practical demonstration of land rehabilitation and solutions being tested. The expectation was that the leaders would then be able to educate their people on the causes and consequences of land degradation and emphasize their collective role in fighting it collectively. Some of the participants were requested to guide group discussions on selected topics including traditional management of pasture, water, indigenous knowledge of vegetation and land use, and why in their opinion many development projects failed. Including participants as active contributors was an acknowledgement of their indigenous knowledge and afforded an opportunity for understanding their perception of land degradation and knowledge of historical changes of the environment.

Following their visits to the IPAL study area and participation in practical demonstrations of the scientific and development

work, the participants (some of whom were from the study area) were requested to give their opinion on the recommendations being prepared by IPAL.

Eight years after the workshop series, some of the areas previously severely degraded are now showing a recovery trend. This may have resulted from a combination of factors. Following a presidential decree, all Locational and Divisional chiefs (locations are the smallest administrative units of the districts) throughout the country were required to establish "chiefs' tree nurseries". Because tree planting projects have generally been a failure, some local chiefs used natural tree regeneration as a basis for tree conservation in their locations.

Educational Implications of the Resource Management Guidelines

The most significant result of IPAL research was the compilation of resource management guidelines. This document remains a basis for future development for the region. As such, it has enormous implications regarding people's participation and therefore training and education. The Integrated Resource Management Guidelines for the West Marsabit District (which is in two volumes) dealt directly with people's needs and aspirations with a view to suggesting ways and means of improving range and livestock production, while at the same time reversing land degradation. The plan concerned itself with common failures of development in the rangelands in general. It addressed many socio-economic factors usually associated with project failures. The aim was to stimulate the pastoral subsistence economy, by making it more secure and less vulnerable to the vagaries of recurrent drought (Lusigi, 1984, 1988; Oba and Lusigi, 1987).

The resource management guidelines were the product of a long term research (1976-1984) and discussions with local pastoralists, government officials, local leaders and non-governmental organizations. From the discussions, it became obvi-

ous that the Rendille people had an understanding of their requirements. They listed their education and development needs in the following order:

- water development
 - improvement of livestock marketing
 - improvement of medical services
 - improvement of veterinary services
 - improvement of public security
 - leadership which will unite all the people of the tribe in a development effort
 - drought assistance.
- Although important, the following needs were missing from their list:
- grazing control
 - registration of tribal rangelands in order to place them on a firm legal basis
 - means of storing wealth (e.g. banks)
 - use of alternative materials for constructing livestock enclosures
 - mobile extension service
 - removal of livestock from settlements.

Generally, the Rendille people supported the plan, although their expectations were mixed. The majority believed that IPAL had a moral obligation to implement the plan. Others were sceptical, viewing the plan in the light of other plans which have been discontinued. Views of some elders representative of the Rendille people are given below:

Digin: We thank IPAL for proposing such a comprehensive development plan. We are in agreement with all your recommendations. If your plan is implemented the (Rendille) people will benefit. When you arrived for the meeting, we thought it was going to be the same old non-productive gathering we were always called upon to attend. We shall inform others of the good news you brought.

Kirinyal: In your recommendations you have mentioned all our needs. But from past experience, we shall not be in haste to accept these promises until we see the outcome. Under this same Acacia tree numerous promises were made first by government officers, then missionaries, politicians, and now you, IPAL. Many of our elders have since died before seeing the outcome. It is because of this that we remain sceptical about your development proposal.

Sonno: When a hungry man is promised food that is never forthcoming, he will not believe even when the promise is made good. What you have rec-

commended is too good to be true. If you fail us in this, we better not see you again. We are people in desperate need of water, security, hospitals, better food supply and reliable livestock marketing. You must do all you can to have your proposals implemented.

Dhage: We people of the Rendille ethnic group have never come to believe that there are others who were concerned to solve our problems. The testimony of this is the little development in the area, lack of education for our children, poor roads and non-existent livestock marketing. But we appreciate what IPAL has done. You have helped to treat our livestock, provided our sick with transport and used your radios for reporting raids on our livestock. We are happy with your proposals, especially with regard to water development. Your recommendation about moving of livestock out of settlement centres and transportation of milk products by camel caravans from *fora* to settlements and goods and services from settlements and vice-versa must be supported.

Kurgat: Your recommendations on improving marketing, development of shallow wells and movements of livestock will be supported. You should, however, ensure that all your proposals are implemented. Then, your contribution will not only benefit us but the future generation.

The West Marsabit Integrated Development Pilot Project (WMIDPP)

The aim of WMIDPP was to test key recommendations of IPAL on a pilot scale. The Wamba Food Security Programme (WFSP) of the GTZ running development activities in the neighbouring district of Samburu granted initial funds in 1985. The areas of Ngurunit, Ilaut and Korr were selected for the pre-extension work. The region was inhabited by a cohesive group of Rendille nomads—the Ariaal (Spencer, 1973). The principle objective of WMIDPP was to stimulate the pastoral economy through increased sales of livestock and to increase the purchasing power of the people, to serve as a venue for training and to facilitate supplies of essential goods to people in remote camps.

The implementation exercise was coordinated by pastoral groups whose membership comprised of half of the total

population of the people in the study area (Njiru, 1985). Altogether, three groups representing Ngurunit, Ilaut and Korr were established to coordinate the pre-extension activities. Each group elected a management committee of 12, composed of elders, chiefs, politicians and representatives of women's groups. Cooperation with government departments was limited to technical personnel seconded to the programme and regular participation in the District Development Committee (DDC).

Development of Mobile Services and Training

Over a short period of time (1985–1987), WMIDPP achieved most of its development goals. The major input was to test IPAL's hypothesis that if livestock were moved out of the settlements to *fora* camps from where milk and other livestock products could be transported by camel caravans and the same means of transport used to carry back non-pastoral goods and services, the places which were then severely degraded would recover and people and livestock could be more uniformly distributed over the range. Consequently, WMIDPP constructed two storehouses to supply mobile shops served by camel caravan (Njiru, 1981). The strategy had a significant outcome. Local pastoralists were trained to run the mobile shop business. The shop attendants were initially employed by the project and trained in book-keeping. Gradually, WMIDPP allowed them to buy the business with soft loans provided by the project. Despite some initial technical difficulties, the shops were cost effective. According to Njiru (1986), even after the project had charged goods with a 30% profit margin to cover transport, its entry into the market reduced consumer prices of essential goods by about 50%. Furthermore, the mobile shops had an enormous bearing on the environment. Availability of goods and services in remote areas reduced movement of people and livestock into settlements, and allowed more even distribution over the range.

The nomads' purchasing power for essential goods and services depended on livestock sales. Previously, livestock marketing was a great financial loss. The role of WMIDPP was to facilitate livestock marketing and increase participation by local nomads. Market yards were established in the three centres, with marketing organized on a regular basis. Regular livestock marketing in the pilot area attracted traders from as far away as the neighbouring districts of Isiolo and Samburu. Participation of WMIDPP in the sales created aggressive competition resulting in price increases of 50% over those offered by the traditional middlemen (Njiru, 1985). Livestock marketing provided a regular source of income for the nomads, in addition to practical training in livestock sales.

Despite the obvious successes, some problems were experienced during implementation. The main drawback was outstanding credits incurred by the mobile shops. The shop attendants were socially obligated to provide credit facilities to their relatives but the practice minimized the purchasing power of their business. WMIDPP had avoided giving free services to the nomads, which created initial discontent. Later, however, the position of the programme was immensely appreciated by the members. Nonetheless, some local leaders and traders were opposed to the project for personal or business reasons.

Most importantly, WMIDPP's capacity to implement the resource management guidelines depended on a long-term financial guarantee. This was not pledged. The future of WMIDPP became precarious, firstly when the Wamba Food Security Programme withdrew its support and secondly, ensuing the handing over of its investments to the Kenya Agricultural Research Institute (KARI) in December 1987. KARI was not obligated to continue with the implementation work, neither did it provide funds. These changes were emotionally traumatic for the members as no attempt was made to explain why such a

successful project should end in such an unnatural way.

Three years later, all development activities and monitoring had ceased. The local nomads, in spite of these events, continued with management and protection of the trees. But the interesting outcome was a dramatic increase in the activities of the mobile caravans set up by non-WMIDPP members. These mobile caravans had increased from 6 to about 30 (Mohammed Saa Nane, pers. commun.). Two factors were responsible for this: firstly, WMIDPP had demonstrated the economic returns of mobile shops. Secondly, following the termination of WMIDPP's activities, more local traders purchased transport lorries and set up wholesale warehouses. Thus, despite high prices charged on essential goods, many mobile shops remained in operation.

People's Participation in Land Rehabilitation

In the pilot area, cutting of trees and gully erosion were familiar problems in the environs of settlements and water points. Following lengthy discussions with the committee members, the local nomads and the chiefs identified areas which needed protection. Then, with the help of local labour, red paint⁴ was applied to trees in sections of the woodlands to be protected. The practical application of this management strategy was to give young trees a chance to grow past goatbrowsing height through communal consensus. When this was achieved, the areas were opened up once again for communal use, while previously used areas were painted and protected and so on. In the long term, this management strategy was expected to improve tree regeneration. The popularity of the method was demonstrated by tree painting activities outside the pilot area.

Discussions

Too often, development programmes in ASAL have failed as a result of inappropriate extension methods. For the most part, extension programmes drawn up for the nomadic communities fail to build on indigenous knowledge and cultural predilection.

IPAL too, was faced by these challenges. But unlike many development projects, IPAL had some special features which affected the outcome of its educational work. Central to the project's multidisciplinary work was the position played by the Rendille people. They are part and parcel of their environment, have the power and the will to change the course of events and are therefore able to influence their future. Their limitations are those imposed by the immediate physical, biological and socio-political environment. The role of education and development is to minimize detrimental effects and help internalize changes which are in harmony with their survival strategies. Thus, IPAL's education and training programme was first and foremost aimed at public relations work. Secondly, it recognized the existence of the pool of knowledge on which it founded its education programme. This could not have been accomplished without understanding the operation of such knowledge, the way it is transmitted and more importantly, how it relates to scientific knowledge. Thirdly, as a research programme, IPAL tested the functioning of such knowledge and gaps that existed, and their suitability and limitations.

In the past, environmental education was ignored by extension workers. There was an assumption that extension workers had packages to deliver and that the role of the nomads was to accept them. There was little attempt to understand indigenous knowledge and new principles of environmental conservation were those pulled out of the pages of scientific text books. This fact was clear to IPAL. In teaching people about the environment, the common educational

dictum of "going from the known to the unknown" became a useful guide.

In addition, many programmes failed because they could not be sustained. IPAL had for example tested various media for education, some of which like the radio test programme could not be sustained after IPAL ceased its support. This has now become a characteristic feature of all development projects in the arid zone.

Although the issue of indigenous knowledge has been discussed at some length, one must in the same token speak about indigenous programmes and indigenous funding sources. It is the view of the author that the major problem of arid zone development, or development of any rural economy for that matter, is its dependence on foreign aid. WMIDPP was a typical such project which heavily relied on donor funding. The project failed to make alternative plans in anticipation of problems with funding. The nomads not being made aware of these complexities finally found themselves abandoned by the people who had made promises.

Thus, dependence on donor money for development implementation entails its own risks. In most development programmes, operations continue for as long as donor funds are available. It is probably important for planners and extension workers to recognize that funding by donors is subject to several factors. Most donor agencies are subject to changes in priorities, leading to sudden cuts in allocated funds. Furthermore, many development projects are not fully integrated into national development programmes. Thus, when these programmes are handed over to the national institutions, continuity is rarely sustained.

Four years after WMIDPP activities had ended, however, a new development project (funded by GTZ again) has been inaugurated in the area. Whether this new project will learn from the preceding projects' experiences is not yet clear.

Conclusion

Planning extension and education work among nomadic communities offers challenges which require urgent appraisal. It must involve improvement of communication between nomads and extension workers. Moreover, extension workers should be motivated and rewarded for their initiatives. In the past, posting of extension workers to northern Kenya was considered as a punishment. One can hardly expect motivation and initiatives from this type of worker. It seems more likely that they will use all available opportunities to frustrate the endeavour.

At another level, extension implies active participation by the local population. The societal organization is the basis by which key decisions are made and access to range resources regulated. No extension work can be purposeful until it integrates itself into the organizational structure of the communities concerned. Once this is achieved, appreciation for development is increased. On the other hand, if the extension endeavour remains peripheral to the decision-making structure of the people, its capability to implement projects is thwarted.

IPAL's work has demonstrated the benefits of understanding people's organizational and decision-making structure in planning extension. It should, nonetheless, be emphasized here that there are subtle differences between various pastoral groups. Although the decision-making process is somewhat similar, the model structure and the authority that goes with it are different in scope and effectiveness. One group may display more sophistication in the way its resources are managed, in comparison to another where group authority is limited and resource use not well regulated. Among the traditional Borana for example, access to communal resources is defined by the *Gada* (Legesse, 1973) and *adha seera Borana* (the Borana laws and regulations). There is *adha* (law) for every resource. The *adha seera* of water (Legesse, 1973; Helland, 1980; Oba, 1990) has been

effectively used to control grazing. Among the Rendille, on the other hand, group organization is clan based. In their case, rules and regulations regarding access to water or pasture are not well defined. I would suggest that grazing management can more easily be implemented among the Borana (as long as these programmes do not conflict with *adha seera Borana*) than among the Rendille, because in the former, institutions already exist which oversee access to communal resources. The Rendille pastoralists probably need more extension services to achieve this. This may involve plans to organize cooperation between various camps. In IPAL's recommendations, grazing committee members were representatives of all major clans.

Thus, organizing effective extension work among nomadic communities is complex. It demands adequate understanding of the people and their cultural organization. Additionally, the role of extension service is to understand people's priorities. Some needs are felt, while others are not. The unmet needs under certain circumstances may require more urgent attention than the felt needs. In IPAL's case, the unmet needs were the most important aspect of the resource management guidelines.

Each nomadic community has taboos and expectations, organizational systems and channels of communication which all influence the effectiveness of extension work. It is advisable therefore, for extension to be tailor-made to the needs and experiences of each pastoral group. Extension workers need to appreciate the uniqueness of each community and recognize barriers to extension work that are intrinsic in each society.

As outlined here, there are many risks involved in planning extension among nomads. Hasty measures aimed at a quick outcome will not succeed. Advantages can, nonetheless, be gained if extension and education work are implemented gradually. This can be appreciated when one considers possible misinterpretation of project goals.

By nature of their survival strategies, pastoralists in general are risk-averse and would be distrustful of projects which demonstrate no reassuring results. This attitude has been augmented by common failure of development projects. Consequently, extension work must be flexible and adaptive. Another important aspect of planning extension among nomads is not to depend too much on generalizations. It is imperative that extension work planned for one community be modified to meet the requirements of a different group. For example, programmes which focus on cattle production will not be successful among camel-owning pastoralists. Similarly, camel-based development programmes targeted to a group for whom cattle production is most important will not be accepted.

Extension programmes designed for the nomadic communities of northern Kenya must be conscious of the many problems (including drought, inter-tribal raiding, disease, thirst, communication breakdown, and economic disasters as a result of drought and famine) which constrain extension work.

The outcome of any educational and extension work is seriously influenced by the duration and level of funding. Range development programmes are so fraught with failure that most donors are now less willing to invest in them. Despite such concerns, if properly designed, range development schemes may in the long term yield positive returns. The returns may not necessarily be ranked on a scale of monetary economics, but rather by the extent to which they improve the living conditions of the local people and conservation of their environment.

Notes

¹ *Baraza* is a kiswahili word which means a crowd. It is the means of communication used by administrators, politicians and extension officers when addressing the public.

² *Sorio* is an Oromo/Rendille word for sacrifice. During the *sorio*, all camels in satellite (*fora*) herds and

herders must return to the main camp. The *sorio* is celebrated three times in a calendar year.

³ *Almatho* is the ceremonial ushering in of a new year (see Robinson, 1985). All family members and their livestock are expected back at the main camp to celebrate the New Year.

⁴ The idea of applying red paint to trees as a conservation measure was first tried by the IPAL scientists. Red paint was used to mark the woodland transects. The nomads avoided cutting trees with red paint, perhaps associating them with ill luck.

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Acknowledgements

The author wishes to acknowledge the contribution of all the IPAL scientists and consultants, especially Dr. Irma Allen (Education and Training Consultant), Dr. George Njiru (Pastoral Economist), Prof. Walter Lusigi (Co-ordinator), Dr. Michael O'Leary (Human Ecologist), Dr. C.R. Field (Livestock Ecologist), Dr. Hugh Lamprey (Woodland Ecologist) and Mr. Sokote Seyee (Assistant Extension Officer). Mr. Hussein Yussuf helped with information compilation, for which the author is very grateful. The interpretation and opinions expressed in the paper, however, remain the responsibility of the author.

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